Effective Mixing

Installation, Operation, Maintenance Manual

FluidMix®

Edición 2014.01

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General

- ✓ This technical manual contains the necessary instructions to install, start and maintain of FLUIDMIX® agitators and must be in hands of the personal in charge of these tasks.

- ✓ It`s imperative to read this manual before the mounting, disassembling or start-up of mixers, in order to avoid risks of accidents and damages to persons, to machines and installations.

- ✓ In the repairs accomplished by the user himself / herself, use only original spare parts. Ask FluidMix for information about recommended spare parts and agitators section drawings.

- ✓ It is advisable that the user keeps in his stockroom spare parts recommended by FluidMix to be able to repair the machine as soon as possible.

Identification

Identification:

✓ Each agitator has got a characteristic plate in stainless steel with the following information (except for small special models integrated in equipments):
✓ Agitator model
✓ Reference FluidMix (OW-xxxxx).
✓ Fabrication date
✓ Fabrication number
✓ In case of asking for spare parts or information about our machines, and in order to avoid mistakes, you have to mention the data of the characteristics plate, specially FLUIDMIX reference and the fabrication number.

Spare parts and repairs.

➢ **Spare parts**:

✓ It is essential to use original spare parts for FluidMix mixers
✓ To avoid mistakes when asking for spare parts it is necessary to mention the data of the characteristics plate, specially FluidMix reference (OW-xxxxx) and the machine fabrication number.

➢ **Repairs**:

✓ FluidMix has got a repair service in our workshop. We will give you a quotation once the machine has been checked and before repairing it.
✓ In case of breakdown, please, contact FLUIDMIX to try to solve the problem by phone. If this were not possible, it is necessary that you send us the machine, **always freight prepaid**, together with a note explaining the damage. Machines under guarantee are repaired and sent back as soon as possible and for those which are not under guarantee we give quotation and wait for its acceptance.
✓ If there are big machines which dismounting or transport invalidate the previous system, our technicians would move to the installation, subject to the acceptance of the written quotation.

Guarantees.

- **General**:

✓ FluidMix guarantees its supply during 12 months after the delivery against any defect of design, material or execution. This guarantee covers the substitution or repair by our charge and in our workshops of all faulty parts, being the buyer who must prove the mentioned defects. The substitution of one or several parts during the guarantee period does not extend this period.

✓ FluidMix **guarantee only covers the supplied machine(s); no reclamation is admitted in case of breakdown for possible damages caused to the installation, to the product or to the quality of the production or for a decrease of it.**

- **What the guarantee do not cover:**

✓ Costs resulting from dismounting, assembly and transport operations.
✓ Damages caused by an incorrect installation.
✓ Deterioration due to negligence.
✓ Damages caused by maintenance defects.
✓ Parts submitted to wear.
✓ Working after modifying the service or exploitation conditions.
✓ Deterioration resulting from storage in unsuitable conditions.
✓ Installation of spare parts or accessories different from FluidMix supply.
✓ Dismounting by the user of subsets such as mechanical seal cartridges, reducers or motors **invalidates the guarantee**..
✓ Wear in the shaft and propellers coating, rubber or plastic, because it is considered as normal.

Safety advices.

Safety symbols:

Safety messages and warning labels must be strictly adhered to in order to prevent accidents, as well as personal and property damage. The content of the section and embedded safety messages as well as warning labels in the individual risk levels is as follows:

Dangers:

Danger

Warning: The machine can be damaged.

Danger of electric current.

Risk of being bruised by moving parts.

Floating load. Danger of carriage.

Danger of falling-down parts.

Danger of falling.

Danger of poisoning.

Imperatives:

Documentation. Consult it unconditionally!

Safety helmet.

Carrying strap.

Respiratory mask.

Basic safety rules:

- **Motor:**

  - ✓ Comply with current electrical regulations.

  - ✓ The cable entry in the terminal box is made through a gland with characteristics appropriate to the installation. Once the connection is realized, mount terminal box cover with its corresponding gasket to prevent accidental contact with terminals.
  - ✓ Always connect the motor housing to a ground.

  - ✓ Motors must always operate with the fan cowl mounted in position; top grille must be free from obstructions to avoid excessive heating of the motor.

- **Reducer:**

  - ✓ The agitator moving parts that are not inside of the tank should be covered with protections (grids, plates...) to prevent accidental contact. If due to the constructive characteristics of the equipment it's impossible to mount a protection "**avoid inserting hands or any object through the existing access**"

- **Mobile parts:**

  - ✓ Protections shall only be removed for maintenance. Once carried out, refit all guards before restoring power.

- **Tank:**

  - ✓ No work outside or inside of the tank can be made without making sure the disconnection of the power supply and clearly indicating at the point of disconnection, the works that are being carried out at the mixer area.

  - ✓ All tanks, open or closed, require special security measures. It is essential that personnel of installation, commissioning and maintenance of the equipment are aware of such measures.

  - ✓ A tank can be considered a "confined space", which implies a number of special risks, such as the lack of oxygen. Never enter a confined space unless you are fully trained and have proper safety equipment.

  - ✓ In general, before entering a deposit it is required the necessary equipment to verify that it is a safe atmosphere as well as helmet protection, safety harnesses and lifting equipment.

  - ✓ Open vessels equipped with an agitator must be provided with adequate protection to prevent the fall of objects or persons inside the tank, as well as accidental contact with moving parts. The user is responsible for adapting these protections.

  - ✓ Before entering a deposit make sure that there are no noxious or explosive gases inside.

  - ✓ For potentially explosive existing conditions, take all necessary measures to get make the work area safe, requiring special tools and work processes. If this is not possible, a risk analysis must be done.

Reception, storage and carriage.

- **Reception**:

  At reception of the material it is essential to check the following points:

  - ✓ Check the transport delivery note with the material, number of packages, point of departure, etc...
  - ✓ Specify in writing to the forwarder who delivers any fault observed in the external of the packing such as strokes, breakings, humidity, rips, etc. opening immediately the package with faults and verifying its content. In case of receiving damaged goods, immediately inform the forwarder and FluidMix. **In case of not doing like that, the eventual claims would be invalidated**.

- **Storage**:

  - ✓ Store the device in its packing, in a dry place protected against strokes and dust, making sure previously that this packing is the suitable to support the environmental conditions in site. Any defective storage before and after the use under special environmental conditions (humidity, salinity, dust, vibrations, corrosion, etc.) restricts the conditions of the guarantee.
  - ✓ Before starting an agitator that has been mounted but has not worked or has been stopped for a long time, check out that there are no leaks of lubricant and the sealing of the motor since, keeping the agitator out of work, especially if it is outdoors, can lead to damage or hardening of the joints leading to leaks of lubricant, or water entry in the motor.
  - ✓ Shafts must be located on an even surface, with its corresponding protections or packings. Never use the agitator shaft as a lever or put weight on it.
  - ✓ In case of assemblies shaft-propeller(s) coated with plastic or rubber consider the previous precautions since just the rub with the floor can cause an exposed metallic point by which the corrosion will start; remind that coating is usually fragile and it is easy to deteriorate if there is not a **very careful manipulation** during storage and assembly.

- **Carriage:**

- ✓ The agitators, depending on the model, they are too heavy to be stored or installed manually. Use a suitable transport.
- ✓ Take every precaution to lift the agitator. Always use the sling hooks when being transported by lifting system.

- ✓ Larger gearboxes have threaded holes for screw according to DIN 580 lifting lugs or Eyebolts. The bolts are not included in the supply.
- ✓ All the eyebolts must be tightened screwed.
- ✓ If you need auxiliary elements of lifting and transport suitable with sufficient capacity, as flat rising (EN 1492-1) and lashing or stowing (EN 12195-2) webbing slings should be used.

- ✓ The machines of transport and lifting should be ensured against slippage!

- ✓ Maximize all precautions possible to lift the agitator. Always use tight slings if you move the agitator with a crane or other lifting system. Lifting or transport with several assistants, two cables or slings must withstand the weight.

Tank. Efforts and weights of mixer.

➢ General recommendations:

- ✓ Vessel which will incorporate the agitator must have the necessary design features to:
  - Avoid vibrations and oscillations of the vessel.
  - Avoid damages in the tank in case that shaft or propeller could loosen by accident or breakdown, even rotating at high speed, with the possibility of a leak of liquids, that may be toxic and/or corrosive.
  - FluidMix declines any responsibility for breakage of a deposit whose design must necessarily contemplate and take into account this possibility of accident.
- ✓ The mixers are designed for mounting on a standard flanges, DIN, ANSI, usually in a vertical position at the top of the tank, although there are other models that are mounted on the side of the tank in a horizontal position.
- ✓ For the fixation of the agitator in a concrete slab, we recommend, to do it with threaded rods.
- ✓ For the correct fitting of the agitator on the tank, it is essential to keep in mind the following points:
  - The mixer shaft is designed to run in a vertical position.
  - Check the horizontal alignment of the assembly drawing according to two perpendicular directions, rectifying the position through the use of cleats, in order not to force the counter flange fixing. Mount and secure with the pair of torque corresponding to the measurement of the screw. See "pairs of tightening" in Appendix.
  - Agitator turbine or propeller should not be directly affected by current flow. If by design of the reservoir conditions the current flow has direct impact on the shaft or turbine, screens baffle must be prepared.

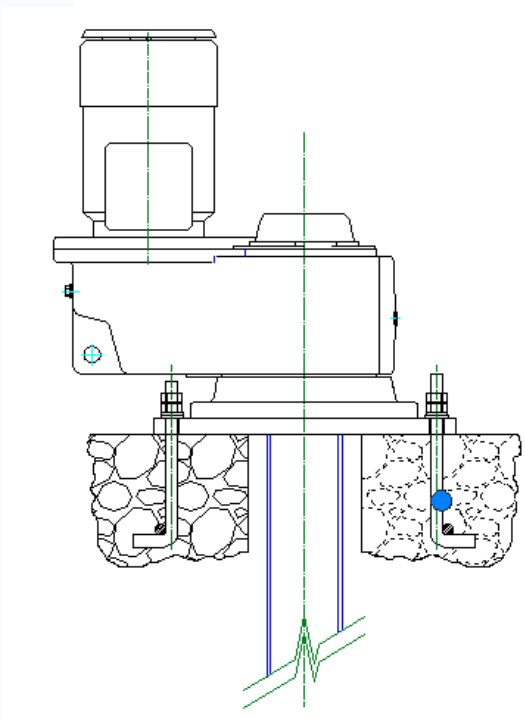
➢ Efforts and weights of mixer

- ✓ During the operation of the agitator, due to turbulence and another series of complex hydrodynamic phenomena, each propeller produces a radial resulting perpendicular to the axis of the agitator and effort applied at its end. This effort multiplied by the length of the shaft gives the bending moment that should be considered for calculating the support structure. Due to the random nature of the forces and the rotation axis, the direction of these forces is constantly changing.

- ✓ For this reason is essential to respect the distances of blades Assembly to the support of the shaker plate, since the machine has been calculated with this hypothesis; placing mobile support plate distances greater than expected can cause serious mechanical faults that in no case would cover the guarantee of FluidMix.
- ✓ An axial flow Turbine generates an axial upward or downward effort depending on whether it is blowing or suctioning, respectively. If the axial stress is up will compensate in whole or in part the weight of the agitator, and may even exceed this weight. If the effort is falling will be added to the weight, what must be taken into account to calculate the corresponding

- ✓ Agitator support structure has been designed to withstand the forces mentioned above, and as a result, the forces are transmitted directly to the mounting bracket. The support structure must be rigid enough to withstand the weight of the agitator and agitator reactions resulting from the axial stress, the moment torque and bending moment.

- ✓ FLUIDMIX will facilitate the efforts to which the agitator is submitted so that provider of the tank or structure support can compute the necessary support.



Mounting and installation.

➢ General recommendations:

- ✓ Make sure that there is a sufficiently rigid support on top of the tank; the lack of rigidity of the support can cause vibrations and damage the agitator.
- ✓ For centered placement in cylindrical tank it is necessary to place three deflectors with an angle of 120º with the dimensions shown on the "DEFLECTORS" section. In case these deflectors don't exist it is necessary to place the agitator with its shaft in the middle of a radius of the tank.
- ✓ Fasten the flange to the structure using the specific screws and nuts (not included in the supply).
- ✓ The agitators, as a general rule, are shipped unassembled, or shaft or mobile, supplying motor reducer on one side and shaft and mobile(s) of the agitator on the other.
- ✓ Once mounted motor reducer according to the recommendations above, it must be mounted the shaft and mobile according to the instructions in the next section.

- ✓ In those agitators that have mounted sealing systems, follow the recommendations of the section "Sealing systems"

- ✓ In the case of several mobiles on the same axis, they have to be placed respecting the mounting positions provided in the project (see respective data sheets and supply).
- ✓ Fill completely the tank with water to do the first test.

- ✓ Connect the motor following the instructions indicated on "MOTORS" section and/or the specific instructions that can be supplied with the motor.

- ✓ Turn the agitator on verifying that the turning direction is the one indicated by the arrow drawn on the reducer for blowing position(*) and the opposite for sucking position; in case of opposite turning direction reverse two phases of the motor.

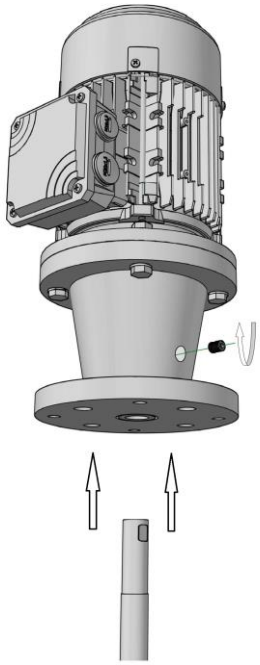
- ✓ **It's not advisable to turn agitators during long time in empty tanks or with the propeller insufficiently submerged.**
- ✓ **No way the agitator shaft must be submitted to bumps or stresses for which it has not been calculated, for example, using it as a lever or to support weight.**
- ✓ **When the agitator is made of coated steel the propeller and the shaft and propeller is a single piece, be cautious when manipulating these pieces because coating is extremely fragile and can't be submitted to any dump or friction because it would immediately create a corrosion point, which would progressively lift the protecting coat and destroy the base material.**

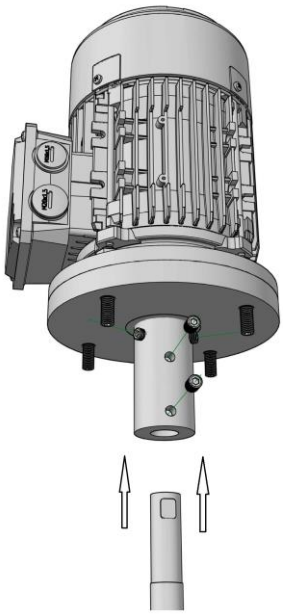
(*)To clarify the meaning of "sucking" or "blowing" propeller consult "PROPELLERS FIXATION" section.

Mounting of shafts.

➢ **Description:**

The shaft`s mixer assembly system will generally depend on if there is or not reducer gear, type of reducer and sealing system provided in each agitator (if existing).





- In VHD3 and VHS3 agitators, the motor are mounted directly and they have connecting elements between engine and shaft, such as sleeve or shield with guide bearing.
- Insert up to the limit the end of the agitator shaft in the corresponding housing of the bearing box (model VHD3) or the guided sleeve (model VHS3) tightening the allen screws through the existing drills at the side of the guided bearing box or sleeve.
- Be cautious to place the mechanized plan of in front of the subjection screw.
- Be sure to tighten all the screws Allen with the couple of tightening listed in "Appendix".

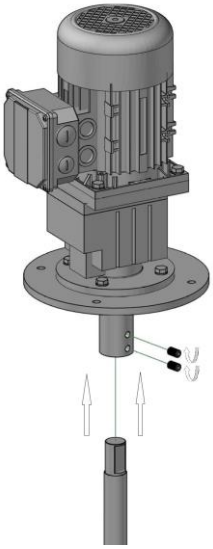
- Never turn an agitator VHD3 or VHS3 in an empty tank or with the propeller insufficiently submerged. Running in these conditions would lead to damages to the shaft and to the guided bearing box or sleeve.

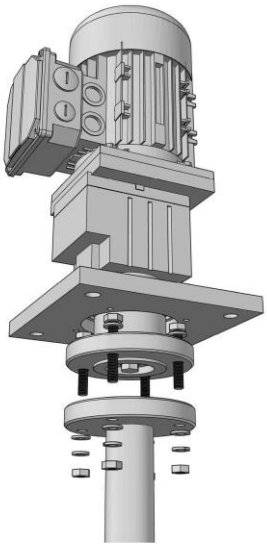
In those agitators with mounted reducer gear, distinguish between those with solid output shaft and those with hollow shaft, adopting forms of assembly according to listed below:

Solid output shaft:

The assembly can be with:

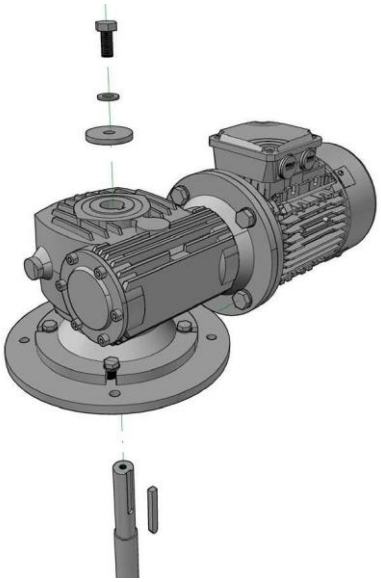
- Sleeve and allen screws: Insert up to introduce the end of the shaft of the agitator in the corresponding housing of sleeve and tighten screws Allen set (see section "TIGHTEN PAIRS"). Be cautious to place the mechanized plan of in front of the fastening screw.
- Coupling, screws, nuts and washers: Locate the flange of the agitator shaft on the coupling with the screws included in the delivery (see the section "TIGHTEN PAIRS"), previously removing any trace of paint or varnish which has been able to get in the faces and paying special attention to the proper support of the coupling and flange faces.





Hollow shaft:

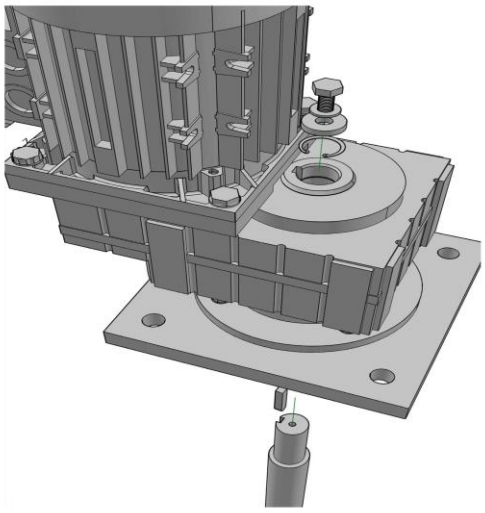
The assembly can be with:

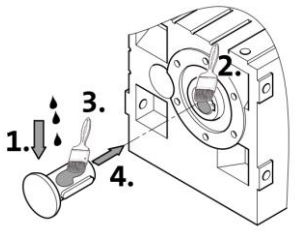


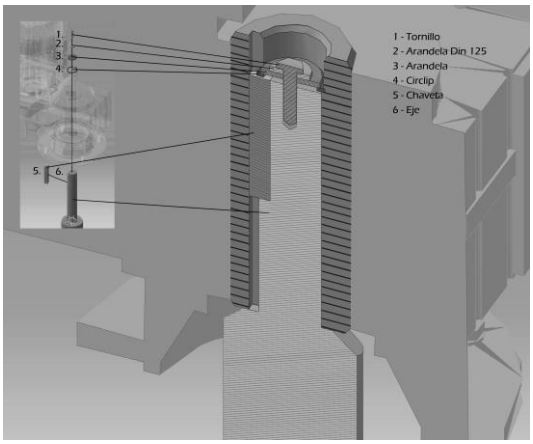
- Screw, washer and key: Insert the shaft through the hole in the reducer to bump into the gear hollow shaft, then assembly the washer and tighten the fixing screw (see section "TIGHTEN PAIRS").

- Be sure to tighten all the allen screws with the couple of tightening listed in "Appendix".

Screw, washer, circlip and key: Apply anti-corrosive paste to agitator shaft both, inside and outside of the hollow shaft of the gearbox.

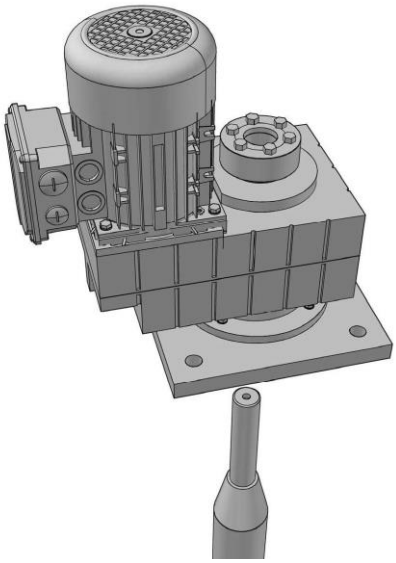


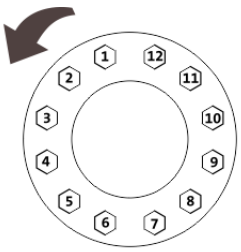




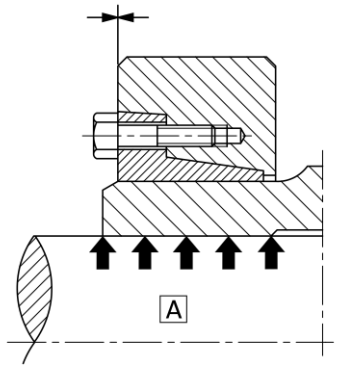
- Shrink disc:

The locking of the shaft to the moto-reducer is made by the shrink disk on top of the hollow shaft of the gearbox. Below are the steps to follow to carry out the shaft assembly:





- Thoroughly degrease the bore over the entire hollow shaft length to make sure that remainders of the anticorrosion agent will not be carried off into the area of the shrink disc when pushing on the agitator.
- Slightly loosen clamping screws one after the other, do not unscrew!
- Position shaft end of the agitator at the entrance of the hollow shaft of gearbox, and after align it correctly, insert the shaft to stop.
- Slightly tighten clamping screws manually.
- Tighten clamping screws one after the other in several passes, with rising torque, evenly until the indicated screw-tightening torque is reached at all screws.



- Several (in general more than 5) passes are necessary until the full tightening torque is reached at all screws! The shrink disc is mounted correctly and fixed when the faces of the outer ring and the inner ring are aligned

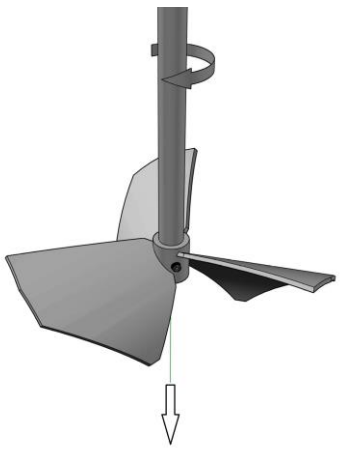
Hollow shaft bore [mm]	20	25	30	35	40	50	60	65	80	100
Torque [Nm]	12	30	30	30	30	30	59	70	59	100

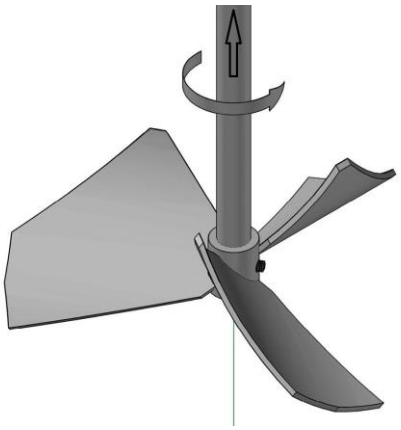
Propellers Fixation.

The propeller(s) fixation to the shaft is made by:

- Pressure screws.
- Screwed on ailerons.
- Assembly system through key and washer.
- Cores of two or three elements under pressure on the shaft.
- Welding; for example for agitators that must be rubberized or plasticized.

Pressure screws.

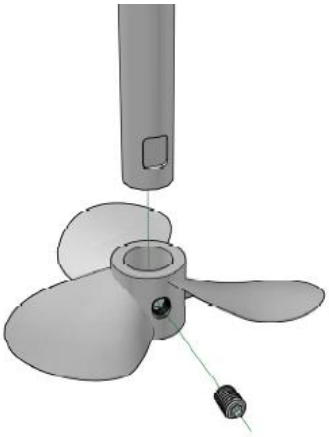


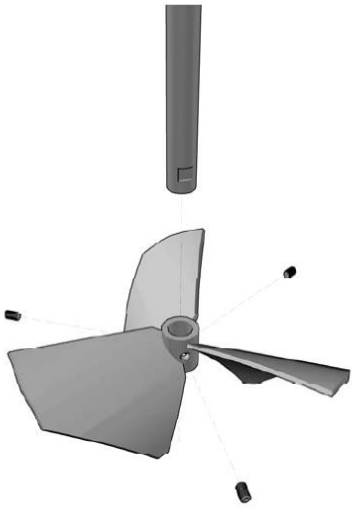


✓ Verify that the propeller assembly position, sucking or blowing, is the scheduled.

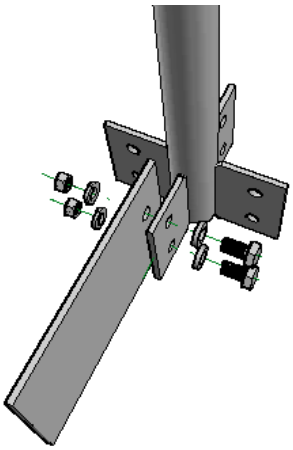
✓ Verify the angular position in the moment of the assembly, if you want to place several propellers on the same shaft. .

✓ Assemble the propeller(s) on the shaft tightening by the allen screw (see "TIGHTENING TORQUES" section). Be cautious to place the mechanized plan of the shaft in front of the fastening screw.

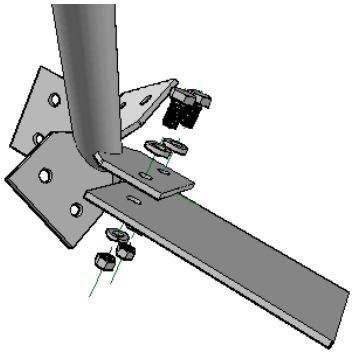




Screwed on ailerons.

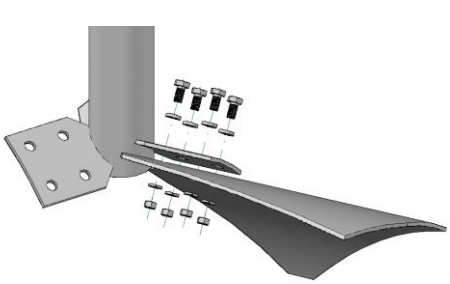


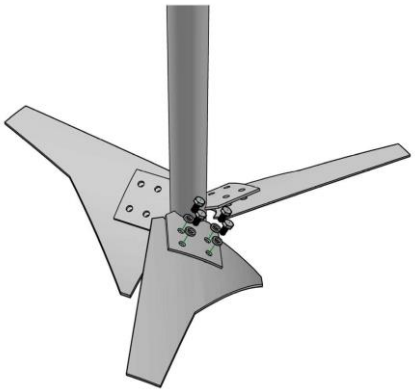
✓ Assemble the turbine(s) blade(s) on the lugs welded for that purpose at the end of the shaft using the screws, nuts and washers included in the supply (see "TIGHTENING TORQUE "section)



✓ Unless the contrary has been specified, every axial flow propeller will be assembled in blowing position, that is to say, with the propeller entering edge in the upside and turning clockwise looking from the motor to the propeller so that, when turning, they produce a blowing flow that helps to sweep the bottom of the tank.

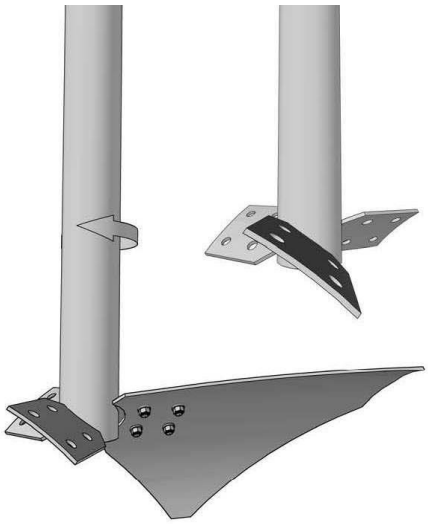
✓ Agitators provided with pitch blade turbines do certainly have reversible flow. To make them work sucking, it is only necessary to reverse the turning direction by changing the position two of the phase wires.



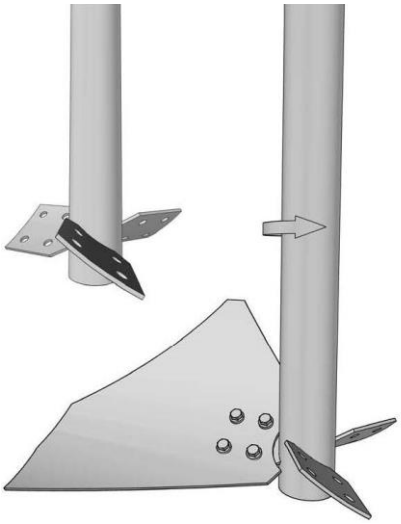


✓ Assemble the turbine(s) blade(s) on the lugs welded for that purpose at the end of the shaft using the screws, nuts and washers included in the supply (see "TIGHTENING TORQUE "section)

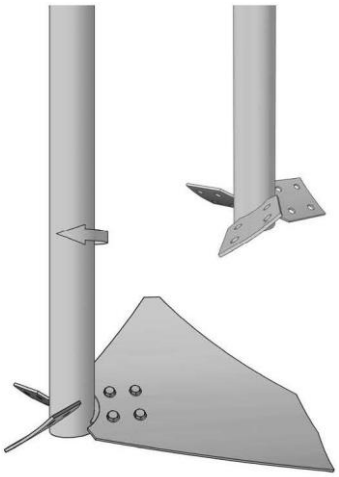
✓ Agitators provided with axial flow helicoidal profile mobiles **do not have reversible flow**. To change to sucking position we do not only have to reverse the motor turning direction but also to turn the propeller 180º before fastening it to the shaft, so that the entering edge keeps on the underside. See figures.



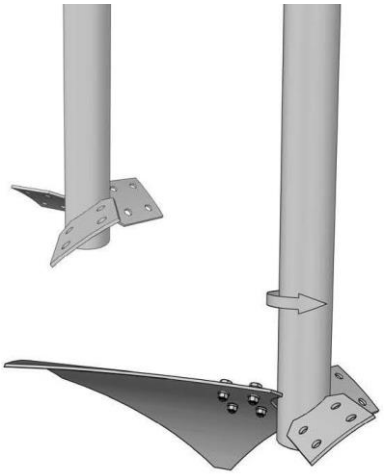
Axial flow helicoidal profile.
Rotation direction: Clockwise,
Thrust direction: downward
Standard Bend



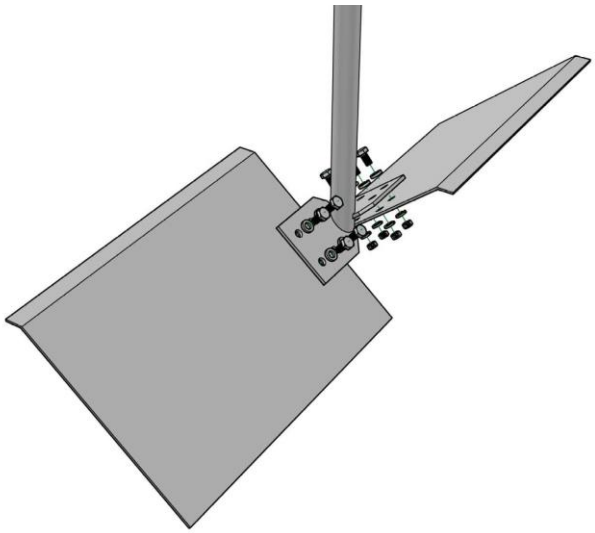
Axial flow helicoidal profile.
Rotation direction: anti-clockwise,
Thrust direction: upward
Standard Bend



Axial flow helicoidal profile.
Rotation direction: Clockwise,
Thrust direction: upward
No-standard Bend

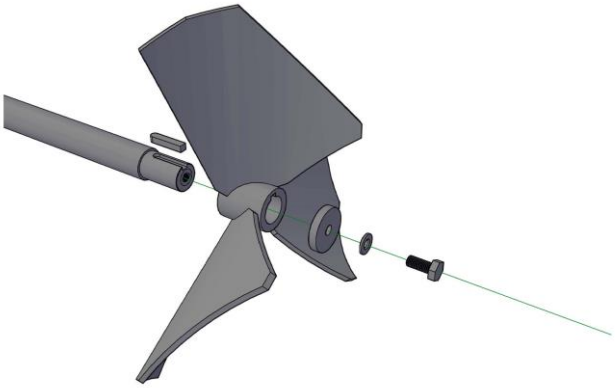


Axial flow helicoidal profile.
Rotation direction: anti-Clockwise,
Thrust direction: upward
No-standard Bend



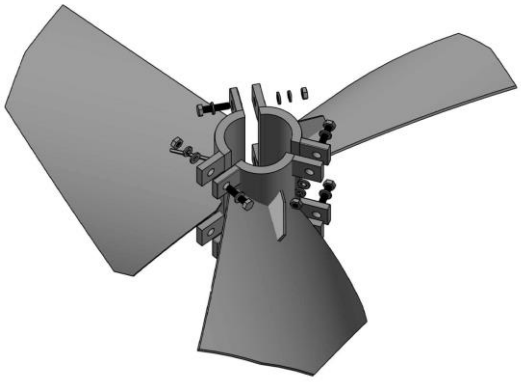
- ✓ Assemble the turbine(s) blade(s) on the lugs welded for that purpose at the end of the shaft using the screws, nuts and washers included in the supply, showing special attention to the position of the existing folds in the blades. These folds should be as shown in the image.

Assembly system through key and washer



- ✓ Mount propeller with bushing on reduced part of shaft as shown in the image. Previously, the key will be mounted in shaft.
- ✓ Insert the shaft in propeller bushing after aligning key and keyway. Tighten using screw and washers included in supply. (See appendix Tightening Torques).

Cores of two or three elements under pressure on the shaft



- ✓ In case of assembling two or three elements on pressure cores, looseness must be evenly distributed when the cores are tightened.

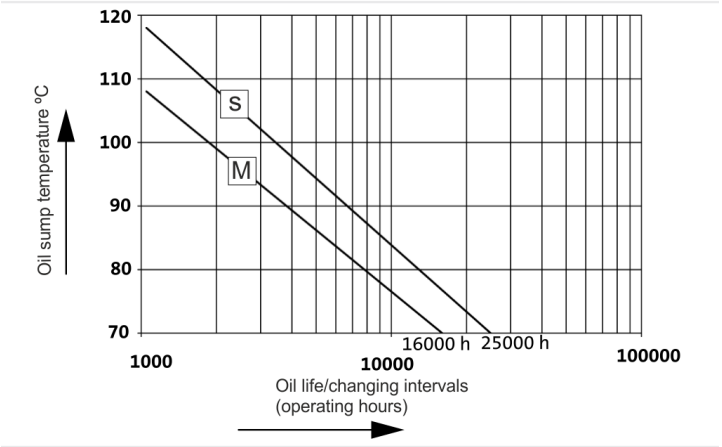
Welding

- ✓ Generally, in mixers whose shafts and propellers need to be coated, propellers are welded directly to the shaft, forming a single piece.
- ✓ If you want to change direction of rotation or flow, you must consult FluidMix.

Lubrication

Description:

- ✓ Next, we describe the oils recommended for the agitator reducers. There are two types of lubrication, **"for life"** lubrication for certain reducers that don't have plugs for filling, emptying or level plug, and lubrication **"with oil" (mineral or synthetic)**. For these last models oil levels must be respected, they are different depending on to the position of work of the machine.
- ✓ Reducers with lubrication with oil require regular lubricant replacement. The lubricant maintenance interval depends on the oil temperature. See the following graphic:



- ✓ Replace seals in case of leakage to avoid consequential damage.
- ✓ In reducers with oil input, drain and level plugs should be a regular oil change.
- ✓ To check the oil level in the gearbox, unscrew the oil level plug and check that it overflows through the hole. Screw the level plug again. If necessary, unscrew the filler plug and fill. Immediately clean any discharge of oil using a degreasing agent suitable to the conditions of exploitation.
- ✓ Usually all reducers are filled with mineral oil VG220 or VG460 according to models (consult to FluidMix), suitable for an ambient temperature of 0 ° C to 40 ° C. For ambient temperatures - 20 and 40 ° C, consult to FluidMix.
- ✓ The amount of existing oil on each reducer depends on working position, size reducer and on some occasions, output speed, so you should consult FluidMix.
- ✓ The lubricants listed in the lubricant table are permissible for reducers. Special lubricants must be used, for example, for long-term storage or special operating conditions.

	Ambient Temperature [°C] 50	0	+50	DIN 515173: CLP ISO 129251: CKC/CKD			Description
	0		+40		CLP	VG 460	Omala 460
	−25		+50 3)		CLP HC	VG 320	Omala HD 320
	−10		+50 3)		CLP HC	VG 460	Cassida Fluid GL 460
	−20		+40		CLP HC	VG 220	Cassida Fluid GL 220
	−20		+40		CLP PG	VG 220	
	−20		+40		CLP PG	VG 460	
Shell	−40	0 4)			CLP HC	VG 46	Cassida HF 46
	−20		+40		CLP PG	VG 320	
	−20		+50 3)		CLP E	VG 320	Omala EPB 320
	0		+40		CLP	VG 460	Klüberoil GEM 1−460 N
	−25		+50 3)		CLP HC	VG 320	Klübersynth GEM 4−320 N
	−20		+40		CLP PG	VG 460	
	−20		+40		CLP PG	VG 220	
KLÜBER LUBRICATION	−30	0 4)			CLP PG	VG 32	
	−40	0 4)			CLP HC	VG 46	Klüber Summit HySyn FG−46
	−20		+40		CLP HC	VG 220	Klüberoil 4 UH1−220N
	−20		+40		CLP PG	VG 320	
	−20		+50 3)		CLP E	VG 320	Klübersynth GEM 2−320
FUCHS	−25		+50 3)		CLP HC	VG 320	Renolin Unisyn CLP 320
	−20		+40		CLP E	VG 320	Plantogear 320 S
	−20		+40		CLP PG	VG 460	
	0		+40		CLP	VG 460	Renolin CLP 460
	−10		+50 3)		CLP HC	VG 460	Eural Gear 460
ARAL	−25		+40		CLP HC	VG 220	Eural Gear 220
	−20		+40		CLP PG	VG 460	
	0		+40		CLP	VG 460	Degol BG 460
	−25		+50 3)		CLP HC	VG 320	Degol PAS 320
Eni	0		+40		CLP	VG 460	Blasia 460
	−25		+50 3)		CLP HC	VG 320	Blasia SX 320
bp	0		+40		CLP	VG 460	Energol GR−XP 460
	−20		+50 3)		CLP HC	VG 320	Enersyn HTX 320
	0		+40		CLP	VG 460	Alpha MW 460
Castrol	0		+40		CLP	VG 460	Alpha SP 460
	−20		+40		CLP PG	VG 460	Alpha PG 460 2)
	0		+40		CLP	VG 460	Spartan EP 460
Esso	−20		+40		CLP PG	VG 460	
	−25		+50 3)		CLP HC	VG 320	Spartan Synthetic EP 320
	0		+40		CLP	VG 460	Mobilgear 634
Mobil	−20		+40		CLP PG	VG 460	
	−20		+50 3)		CLP HC	VG 320	Mobilgear SHC XMP 320
	0		+40		CLP	VG 460	Turmogearoil 460 OM
	−25		+50 3)		CLP HC	VG 320	Turmofluid GV 320
	−20		+40		CLP PG	VG 460	
	−20		+40		CLP PG	VG 220	
LUBCON	−40	0 4)			CLP HC	VG 46	Turmofluid GV 46
	−20		+40		CLP HC	VG 220	Turmosynthoil GV 220
	−20		+40		CLP PG	VG 460	
	−20		+50 3)		CLP E	VG 320	Turmofluid Biolube CLP 320
Optimol	0		+40		CLP	VG 460	Optigear BM 460
	−25		+50 3)		CLP HC	VG 320	Optigear Synthetic A 320
	0		+40		CLP	VG 460	Tribol 1100/460
	−20		+40		CLP PG	VG 460	

Observe the following legend of the lubricant table for the selection of lubricants:

CLP	⇒	**Mineral oil**
CLP PG	⇒	Polyglycol oil
CLP HC	⇒	Synthetic hydrocarbon or poly-alpha-olefin oil
CLP E		Diester oil (wáter pollution class 1)
1)		Polyglycol oils cannot be mixed with other oil types
2)		For ambient temperatures higher than 40°C please contact the manufacturer for exact ambient conditions!
3)		Observe critical starting behaviour for low temperatures! For temperatures lower than −25°C special measures for the motor storage and NBR shaft seals are necessary!
		Food-grade lubricant
		Biodegradable lubricant (lubricant for forestry, agriculture and water supply and distribution)
		Low−temperature oils, observe critical starting performance at low temperatures!

WARNING: if the agitator is going to be mounted on a tank for FOOD INDUSTRY or PHARMACEUTICALS INDUSTRY products!

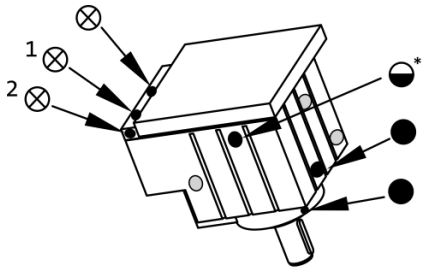
- **The lubricants supplied with the reducer gears are according to the USDA-H2 homologation, that means that they may be recommended for food and pharmaceuticals industry, <u>whenever it is impossible a contact with this products.</u>**

Should exist an occasional technically unavoidable contact between lubricant and food or products, <u>it is the user's responsibility,</u> to fill the reducer gear with a lubricant approved by USDA-H1 standards, in order to avoid a dangerous contamination. FLUIDMIX <u>refuses</u> any claim for damages produced by the non observance of this recommendation

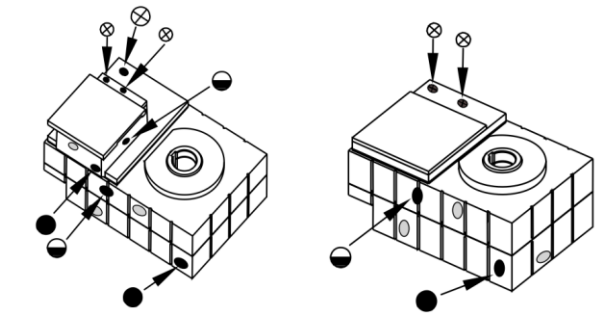
Position of the venting plug, oil input plug and oil drain plug.

Following illustrations show, the position of the venting plugs, filler cap and drain plug oil, depending on the model and position of the gearbox.

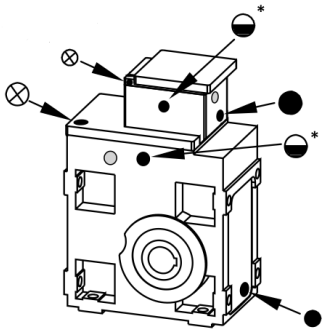
Coaxial with helicoidal gears



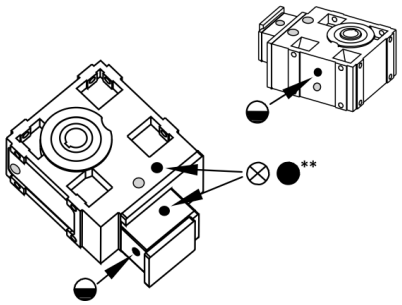
Hollow shaft with helicoidal gears



- Worm gear in horizontal position (mixers HPS3)



Worm gear in vertical position



⊗	Breathing / oil filler plug
●	Oil drain plug
◒	Oil-control plug

Start-up

Motors

➢ **Description:**

All agitators are driven by a motor that can be:

- Electric
- Pneumatic
- Oleohydraulic

In this manual we will see electric motors because they are the most used in most applications.
In case of pneumatic or oleohydraulic motors bear in mind the specific instructions of operation and maintenance supplied with the machine.

➢ **Connection and starting:**

✓ The electrical connection of the Motors must be performed by qualified personnel. Take the necessary measures to prevent any breakdown.

✓ It is necessary to carefully check all rating plate values in order to correctly carry out protection and motor connection.

✓ Before making any connection check if the voltage and frequency available match that indicated on the nameplate of the motor and check that the motor turns freely by manually moving the fan blades.

✓ Check that the section of the cable used is suitable to the voltage, power and distance from the engine up to the connection box.

✓ Before commissioning, as well as after a period of prolonged unemployment or a storage it is necessary to check the insulation resistance!. To measure the insulation the main circuit wires must be disconnected.

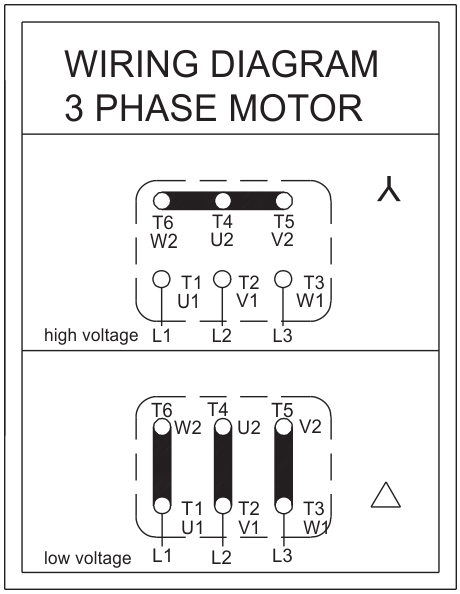
✓ During the measurement, and just after the same, terminals are subject partly to dangerous voltages, so it should not be touched.

✓ If possible, the minimum insulation resistance of the winding on the casing of the machine must be measured for a temperature of the winding from 20 to 30° C for other temperatures apply different values for insulation resistance. Measurement must wait until the final resistance (approx. 1 minute) value is reached

✓ Insulation resistance, at 25° C, must be greater than the reference value, i.e., 100 MΩ (measured at a voltage of 500 or 1,000 VDC).

✓ The housing of the motor must be connected to Earth, and the windings must be discharged by landing to the housing immediately after each measurement, to avoid the risk of electric shock.

- ✓ If the resistance value is not reached, the winding is too humid and must be dried in the oven. The oven temperature should be 90 ° C for a period of 12 to 16 hours, and then 105 ° C for a period of 6 to 8 hours.
- ✓ During heating, plugs the drain holes, if any, must be removed. Closing valves, if any, must be open. After heating, make sure to replace the plugs.
- ✓ Even if there are drain plugs, it is recommended to remove the shields and covers cases of terminals for the drying process.
- ✓ Normally, if the moisture is caused by sea water, the engine must be wound again.
- ✓ Motors should always operate with the fan cowl mounted in his position; the grid of the top must be free from obstructions to avoid excessive heating of the motor.
- ✓ Attention: FluidMix declines any responsibility on machines that have not been installed respecting the safety regulations in force. This circumstance also nullifies the warranty of the agitator.



- ✓ Standard motors are supplied with a connection box of 6 terminals, allowing connection star or triangle according to the position of the bars. In the case of special motors (single phase, two-speed, etc...), with different terminal box or starters/Delta refer specific operating and maintenance instructions that must accompany the machine.
- ✓ Properly connect the ground terminal, which can be inside of the terminal box or on the motor housing.
- ✓ Start the equipment checking the absence of noise and vibration

✓ Normal conditions for continuous service are:

- Room temperature till +40ºC
- A higher room temperature reduces the nominal power (to approximately the 80% for a temperature of 60ºC)
- Height over the sea level up to 1000 m
- A bigger height reduces the nominal power to approximately 8% for each supplementary 1000 m.
- The maximum temperatures in the hottest points of the winding are for class B: 125ºC, class F: 155ºC and class H: 180ºC

Variable-speed driver

- **Description:**

  Variable-speed drive is used to control motor speed and torque by varying motor input frequency.

- **Aplications:**

  - ✓ It is installed in those equipments where it is necessary to adjust the turning speed with accuracy depending on the process.
  - ✓ It can be placed near the agitator, in a control house or in an electric panel.

- **Assembly and starting:**

  - ✓ Put the variable speed drive in a ventilated place without humidity or dust, exempt from metallic particles, vibrations, electromagnetic influences and far from fluorescent lamps.
  - ✓ Use the variator with a room temperature between –10ºC and +40ºC
  - ✓ Always connect the variator to ground to avoid accidents and operation problems.
  - ✓ Verify that the voltage available coincides with the one necessary and it does not have oscillations higher to the 10% of the nominal. In powers up to 1.5 kW. The feed voltage to the variator is usually single phase; the output voltage is always three-phase. Pay attention to the feeding connection of the variators, because if they are single phase and they are connected as three phases, damages are irreparable and under no circumstance they would be under FluidMix's guarantee. Check in the manufacturer's variator manual, included with the equipment, the connection schemes.
  - ✓ Connect the three phases of the motor to the converter terminal. The motor must be fed exclusively from the variator and any type of switch or commutator must be avoided in the wire that connects them.
  - ✓ Always connect the motor to ground through the converter terminal.
  - ✓ Start the converter and verify the maximum and minimum range of speed attainable (measured with a tachometer). This range must coincide with the one specified on the equipment offer. If it is not like that, immediately contact FluidMix because if the agitator turns at a higher or lower speed than the ones scheduled, that could lead to serious damages to it and to the installation.

Reducers

➢ Description:

Reducers for agitators can be:

- Coaxial with helicoidal gears.
- Hollow shaft with helicoidal gears
- Right-angled with hollow shaft and helicoidal gears.
- Worm gear.
- "Tandem" type with parallel shafts for high torque and bending moment

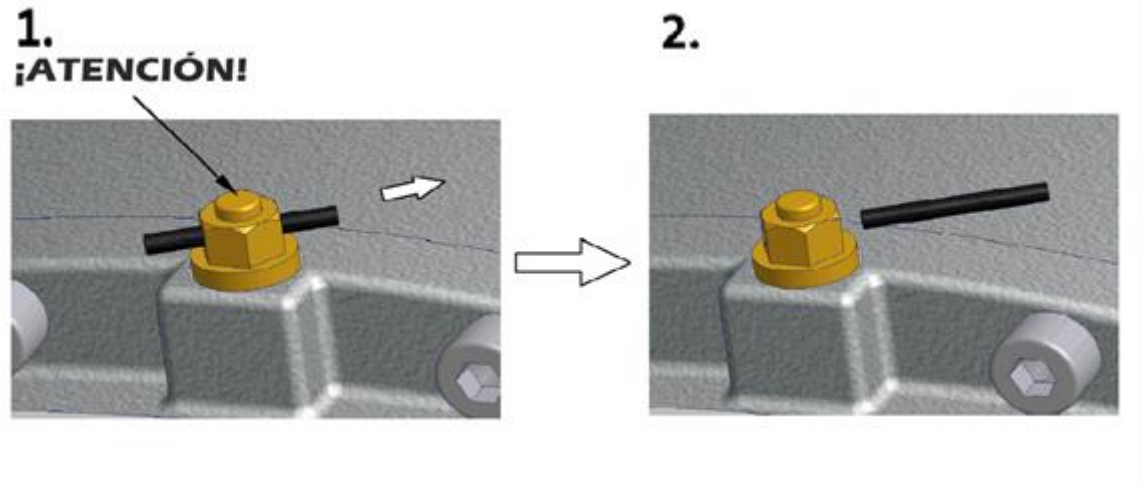
➢ Use:

- ✓ **It can be assembled on any type of agitator either vertical or horizontal when the turning speed required for the shaft is different to the motor speed and constitutes one of the main pieces of these machines.**
- ✓ **In most cases the reducer bearings** are the ones which support the radial and axial stresses generated with the turning of the propeller(s) wether this is vertical or horizontal. That is why these reducers are always specially designed, not only to transmit a torque, but to be able to absorb axial stresses and bending moments.
- ✓ When the agitator shaft is very long or the power to transmit is high a guided lantern is required after the reducer; in this case the bearings of that lantern are the ones that absorb the stresses and the reducer must be exclusively designed to transmit a twisting torque with your specific service factor.
- ✓ The service factor of a reducer is the relation between the maximum transmissible power and the power absorbed by the mobile when it turns inside a liquid. Anyway the transmissible power for the reducer must be higher than the installed motor power.
- ✓ The maximum normal temperature in the frame for reducers with cylindrical gears is 65/70 ºC and for worm gear reducers till 85 ºC. For higher temperatures consult FluidMix.
- ✓ The maximum noise level must not exceed 85 dB for powers less than 37 kW.

➢ Assembly and starting:

- ✓ After having verified the points detailed on *"MOTORS"* section, check that the reducer is firmly anchored and that it has got the specific oil inside. See *"LUBRICATION"* section.
- ✓ The type of lubrication recommended is shown on a label stuck to the reducer where it will be indicated "Full of oil" or "Life lubricated".
- ✓ All reducers are supplied with the oil needed; nevertheless if for any reason the lubricant is sent apart that will be indicated on the reducer to fill it before starting.
- ✓ In reducers lubricated by oil, verify that the level is suitable to the mounting position. In the lubricant input hole it is necessary to put a drilled plug, supplied with the equipment, to allow the degassing. In any work position the tankful plug must be the one with the degassing hole.

✓ To prevent build-up of excessive pressure, sealed vents must be activated as shown prior to gear unit start up.



✓ In any working position, the hole where the venting plug is located is the lubricant filling hole.
✓ Once the equipment is on service, verify the absence of abnormal noises or vibrations in the reducer, as well as its tightness and observe if there is any leak of lubricant. The frame temperature must be controlled after some time of work.

Sealing systems

➢ **Description:**

The main types of sealing systems used in agitators are:

- Lip seal for vertical mounting
- Stuffing box on replaceable jacket with refrigeration or greasing; horizontal or vertical mounting.
- Simple mechanical seal; horizontal mounting in contact with the product or vertical mounting turning dry according to peripheral speed limits, pressure or temperature.
- Double mechanical seal with or without incorporated bearing; it is essential to use refrigeration. This system can support high pressures and temperatures.

➢ **Applications:**

✓ They must be always used when it is wanted to isolate the content of a tank from the atmosphere, either due to the pressure inside, to the temperature, to the product toxicity or of its vapours, etc ...
✓ Vertical or horizontal agitators

➢ **Mounting and starting:**

✓ Lip seal. Start the agitator; no special requirement.

- ✓ Stuffing box. Fasten the screws of the press cover till avoid vapours or liquid leaks, but never fasten thoroughly or block.
- ✓ Stuffing box with grease cup. Apply 4 bumps of lubrication pump each 1000 hours.
- ✓ Stuffing box with refrigeration. Make a liquid compatible with the product and with the vapours in the tank pass through the connections for the purpose.
- ✓ Simple mechanical seal in vertical agitator. Start the agitator; no special requirement.
- ✓ Simple mechanical seal in horizontal agitator. Start the agitator only if you are sure that the liquid level in the tank is over the seal because it is the own liquid which must refrigerate it. Never make it turn dry!
- ✓ Double mechanical seal:
  - Dismount the fixation for transport that carries the shaft jacket (small plates, screws, etc...) according to the specific instructions enclosed with the machine.
  - It is necessary foresee an external lubrication and/or refrigeration system, that can be supplied on request by FLUIDMIX. See detail on "THERMOSIPHON" section.

Thermosifon

➢ **Description and applications:**

Equipment basically comprised of the following elements:

- ✓ Stainless steel container (approx. volume 5 l.)
- ✓ Connection tubes for input and output of the product towards the mechanic seal cartridge.
- ✓ Level small window or connections for it.
- ✓ Connections for cooling coil (optional).
- ✓ Connections for circuit filling with its corresponding valves.
- ✓ Connections for pressurising with nitrogen.
- ✓ Connections for control manometer.
- ✓ Draining connection.

➢ **Connection and starting:**

- ✓ Proceed to mount the system at a level superior to the mechanic seal cartridge by verifying that there are not solid residues that may cause jamming.
- ✓ Connect the tubes to the seal trying to avoid elbows and abrupt changes of direction. The forward tube from the seal to the thermosiphon will be connected in the upside; the return one in the underside.
- ✓ Fill the system through the input connection with clean liquid, free of particles in suspension and compatible with the product in the tank and compatible, moreover, with the faces materials and the seal joints, till the level of the product is seen through the small window.
- ✓ Pressurise with nitrogen through the scheduled connection till achieve a pressure superior in 1 or 2 bar to the existing one inside the tank.
- ✓ In case of operation of the seal under a temperature superior to 100º C, connect a cooling water line to the thermosiphon inner coil (optional).

Comissioning of mixer

- ✓ Each agitator model has been designed to obtain the maximum performance in your specific application. Be sure to mount the corresponding agitator according to technical specifications or drawings of overall dimensions.
- ✓ If the conditions of the process such as density, viscosity, temperature, pressure... vary, it must be checked by FluidMix suitability of the agitator.
- ✓ Verify the existence of no obstacles near the shaft and agitator turbine.
- ✓ A flow stream should never flow directly of on the shaft and the propeller of the agitator. If necessary, deflection screens should be positioned.
- ✓ Do not make modifications to the agitator (change engine, speed of the agitator, shaft length, diameter propellers...), without consulting FluidMix. Any modification may alter the functioning of the agitator, causing serious damage.

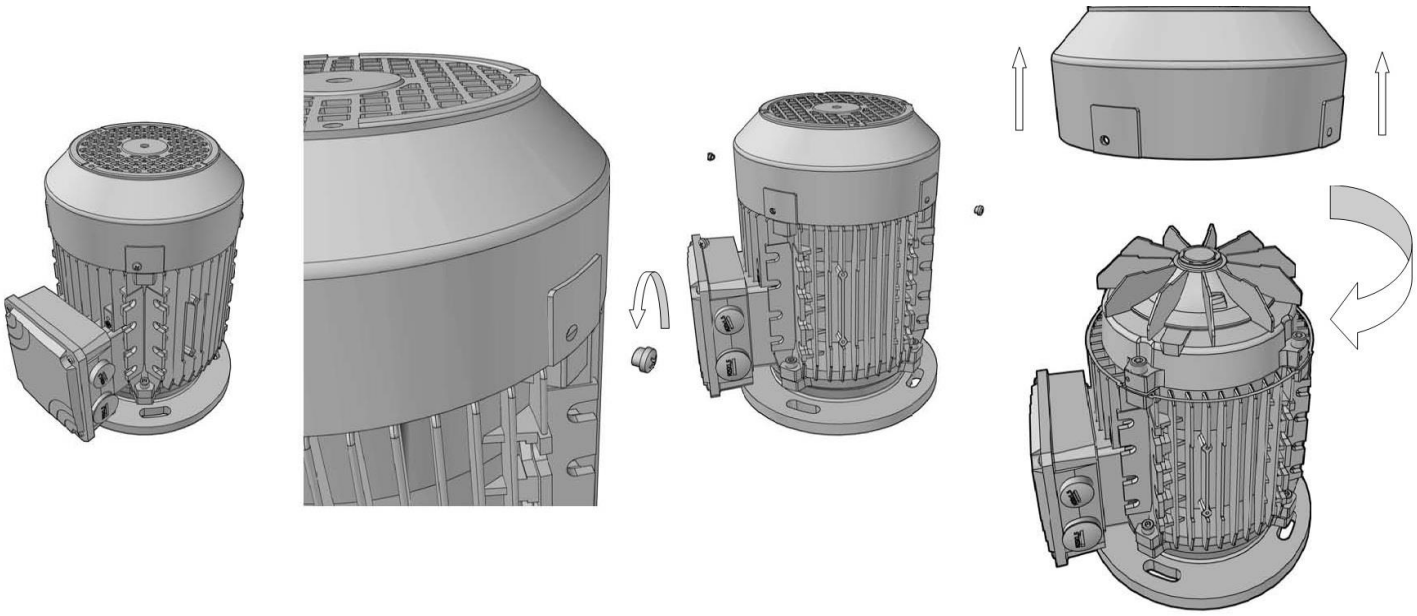
- ✓ If any problems with the agitator, check the installation and read the section "Problems, possible causes and solutions". If this still does not solve the problem, please contact FluidMix.

➢ **Before starting IS ESSENTIAL to check the following points:**

- ✓ The motor voltage which is written on the characteristics plate and which depends on the connection way must be the same that the one that we have in the grid.
- ✓ The mechanic and thermal protections of the motor must be the needed ones.

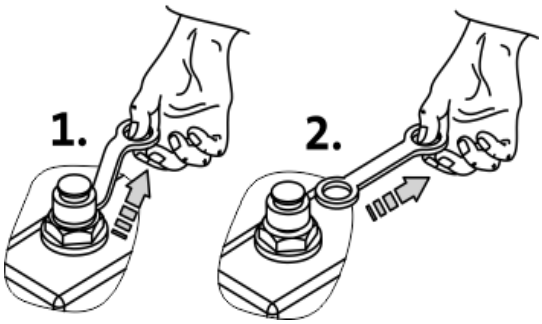
- ✓ The motor frame must always be connected to ground

- ✓ Take apart the fan protection of the motor and turn the fan with your hand to check that there are no hard points and that the propeller turns free. Assemble the fan protection verifying that the ventilator protection cover is free of obstructions.



- ✓ Check that the speed reducer (if there is one) has a suitable oil level.
- ✓ To prevent build-up of excessive pressure, sealed vents must be activated as shown prior to gear unit start up.

¡WARNING!



- ✓ Check that the screws of the coupling that join the agitator head with the shaft are appropriately tightened. In case of rigid coupling plates, before accomplishing the assembly it is necessary to remove any trace of paint, varnish or dirt from the faces which are going to be in contact.
- ✓ Check the correct tightening of the screws that fasten the propeller.

Trouble-shooting

Problems	Possible cause	Action
Motor overload	Viscosity of the liquid too high	Decrease the viscosity
	High density	Increase the power of the motor
Insufficient agitation	Viscosity of the liquid too high	Decrease the viscosity
	Oversized tank for selected agitador	Consult technical department.
	Wrong direction of rotation	Reverse the direction of rotation
	Agitator speed too low.	Increase the speed
	Turbine mounted in wrong way.	Correctly mount the turbine.
Noisy operation	Worm or damaged parts	Check bearings and gears for excessive wear. Replace worn parts. Try to find cause of wear. Check for water and/or abrasives in oil, overload, incorrect rotation, excessive shock,
	Overloading	Check process fluid (specific gravity and viscosity) vs. design conditions. Check agitator speed and impeller diameter against unit assembly drawing information.
	Worn motor shaft	Check the correct fitting of the motor reducer. Check worn parts.
	Structural vibration and sound amplification	Steel mounting structures often amplify small amounts of normal noise into excessive noise. This can be corrected by adding stiffness or sound deadening material to the structure.
	Insufficient or inexistent liquid level.	Check out liquid level in the tank.
	Bent shaft.	Replace shaft.
	Critical speed	Consult the technical department.
Abnormal Heating	Oil leak	Add lubrication oil.
	Incorrect oil	Review Lubrication section of manual. Replace with proper oil.
	Unusual ambient	Units installed in a hot area of a plant where air flow is restricted can overheat. Remove obstruction and if necessary force circulate air.
	Improper oil level	Add or remove oil.
	Cleanliness	Remove dirt and/or product buildup from motor/gear drive.
Shaft does not rotate while the engine is running	Break of the motor shaft or gears of the reducer.	Consult the technical department.
Damaged retainer	Replace retainer	If the retainer is worn it must be replaced. Consult technical department.

If problems with the agitator persist, immediately contact FluidMix.

Maintenance

Motor

- ✓ Most motors with frame smaller than 160 or 200 (see the marks) have got "life greased" bearings.
- ✓ Motors with bigger frame have got oiler(s). This system allows renewing the grease with the motor working, lubrication is recommended each 1000 hours in normal operation conditions. Consult "RECOMMENDED OILS AND GREASES" section
- ✓ Keep the ventilator cover free from strange objects to assure right refrigeration of the frame blades.

Reducer

- ✓ No maintenance for "life lubricated" reducers
- ✓ For reducers lubricated with oil, empty after the first 500 hours of work letting oil flow out through the outlet hole till all the impurities produced by the tread have been dragged. After this period, change each 2500 hours of work or every 6 months, what happens first using mineral oils. Using synthetic oils (see tables on "LUBRICATION" section) the period to change is 12000 hours of work (always after the first 500 hours) or every 30 months, what happens first.
- ✓ In case of apparition of vibrations or abnormal noises, substitute the faulty piece(s) asking FluidMix for a spare parts list.

Sealing systems

- ✓ Lip seal. No maintenance; substitute in case of wear.
- ✓ Stuffing box. Fasten softly the cover when there are leaks. Before the cover reach the limit of its way because of the rings wear, add a new ring of suitable material and quality.
- ✓ Simple mechanical seal. Substitute rub faces and joints when they are worn, ask FLUIDMIX for a spare parts list.
- ✓ Double mechanical seal. Dismount the whole cartridge to substitute the worn elements. This operation must be made in a specialized workshop, so it is convenient to send it to FLUIDMIX for its repair and tests.

Thermosiphon:

- ✓ Verify periodically the level and the circuit pressure in the thermosiphon. Its decrease can mean that there is a deterioration in the seal and that there are leaks in its faces.

Shafts and turbines

- ✓ The emergence of abnormal vibrations is symptom of imbalance on the shaft or in the propeller or gaps in the guidance. Proceed to replace the defective(s) part(s) requesting a spare parts list to FluidMix
- ✓ Check regularly that the propeller or the connecting of this to the axis elements are clean and free of debris.
- ✓ Make sure that shafts and propellers are free of snags with existing elements in the interior of the tank.

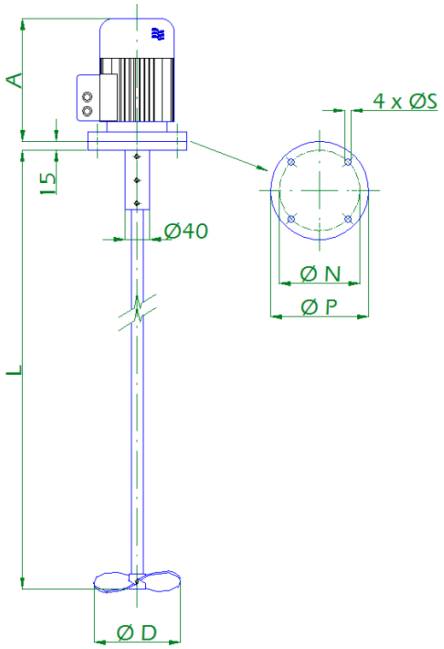
Technical date sheets and spare parts list

- ✓ Next, you can find data sheets of standard range mixers of FluidMix. For other models, please contact with FluidMix.
- ✓ If you need spare parts, consult lists of spare parts, or if you prefer, contact FluidMix, providing data from the nameplate
- ✓ For those special models, contact FluidMix to request the corresponding sheet.

VHS3 SERIES

Description:

The smallest mixers of our range are the VHS agitators. They are fast running mixers, available in three speeds: 750, 1000 and 1500 rpm, and are suitable for little tanks, with volumes from 50 to 1000 liters. Appropriate for chemicals, dissolutions, non viscous liquids. The standard mobile is a three blades marine propeller. Simplicity and economy are characteristics of VHS mixers. The propeller can be easily adjusted along the shaft if necessary, or it can be equipped with two or more propellers.



Main features:

- For tanks 50 – 1000 liters.
- Motor power: 0,12 kW to 0,55 kW.
- Running speed 750, 1000, 1500 rpm.
- 3 blades marine propeller diameters 80 to 140 mm.
- Shaft diameter 15 or 20 mm, length up to 800 mm.
- Shaft and propeller AISI 316, or polyethylene coated.
- Fixation flange with double lips oil seal.

Optional extras:

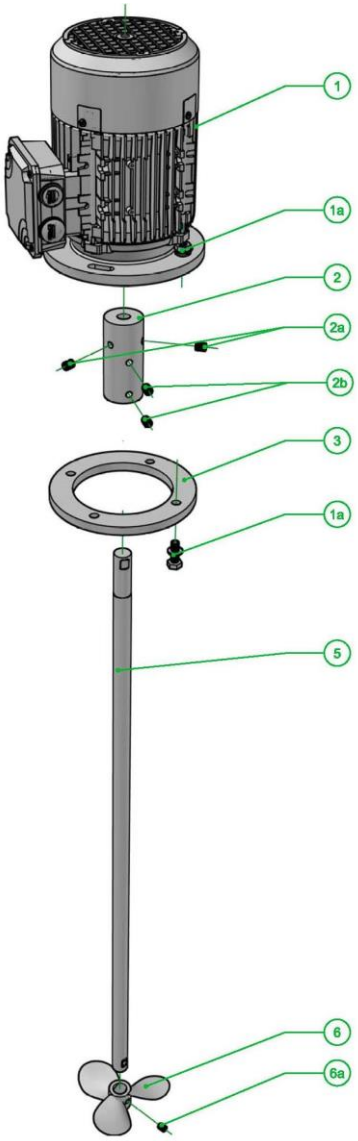
- AISI 316 flange.
- Special coatings at shaft + propeller.
- Food industry execution, polished.
- ATEX motors.
- DIN or ANSI flanges.

WARNING: VHS mixers cannot run in empty tanks!

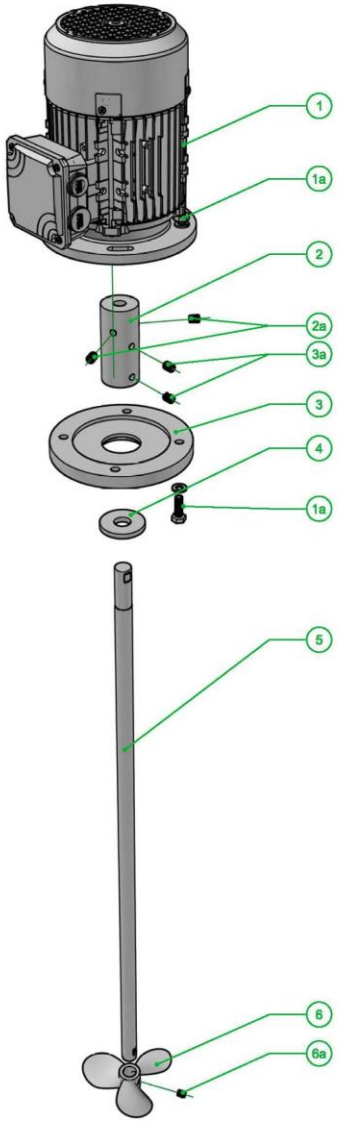
Model	Power kw	Speed rpm	A	D	L max.	N	P	S	Weight Kg	Vol. *
VHS3-00 03 B 00	0,12	1500	188	80	500	100	120	7	7	50 l.
VHS3-01 01 B 01	0,18	750	240	100	800	130	160	10	15	100 l.
VHS3-01 02 B 02	0,18	1000	188	128	800	130	160	10	12	200 l.
VHS3-02 03 B 01	0,25	1500	216	100	800	130	160	10	11	300 l.
VHS3-03 03 B 02	0,37	1500	246	128	800	130	160	10	12	500 l.
VHS3-04 02 B 03	0,55	1000	246	140	800	165	200	11	15	1000 l.

VHS3 Exploded view drawing

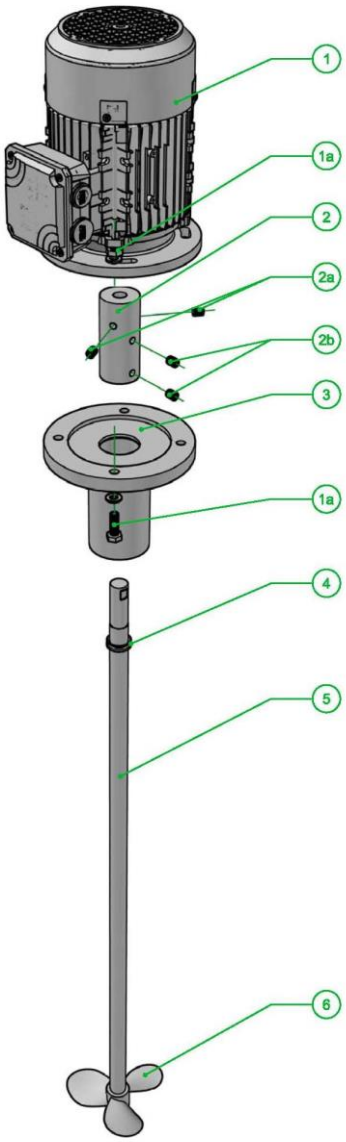
Solucition S1



Solution S2



Solution S3



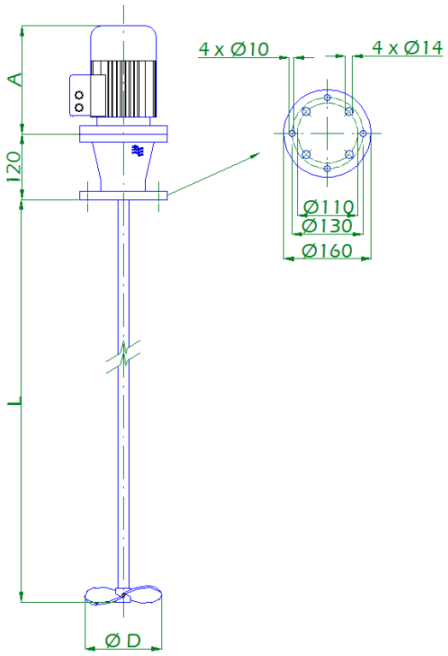
POS.	CANT.	DESCRIPTION	REMARKS
1	1	MOTOR	POWER (ACCORDING TO AGITATOR MODEL)
1a	4	SCREWS, WASHER AND NUTS	
2	1	SLEEVE	AISI 316
2a	2	SCREWS A2 DIN916	ASSEMBLY SLEEVE TO MOTOR SHAFT
2b	2	SCREWS A2 DIN916	ASSEMBLY SHAFT TO SLEEVE
3	1	FLANGE	PVC O AISI316
4	1	RETAINER	NBR OR VITON
5	1	SHAFT	AISI 316 (OPTIONAL AISI 316+PE)
6	1	MARINE HELICE	AISI 316 (OPTIONAL AISI 316+PE)
6a	1	SCREW A2 DIN916	ASSEMBLY HELICE TO SHAFT

VHD3 SERIES

VHD3 fast running mixers available in three speeds: 750, 1000 and 1500 rpm, and suitable for little and medium tanks, with volumes from 200 to 3000 liters. The standard mobile is a three blades marine propeller. An aluminium lantern with a bearing guided inner shaft absorbs the radial forces and allows to reach shaft lengths up to 1500 mm. The propeller can be easily adjusted along the shaft if necessary, or it can be equipped with two or more propellers.

Main features:

- For tanks 200 – 3000 liters.
- Motor power: 0,18 kW to 1,5 kW.
- Running speed 750, 1000, 1500 rpm.
- 3 blades marine propeller diameters 128 to 200 mm.
- Shaft diameter 20 mm, length up to 1500 mm.
- Shaft and propeller AISI 316, or polyethylene coated.
- Flange with 2 mounting options: 110 and 130 circle of bor



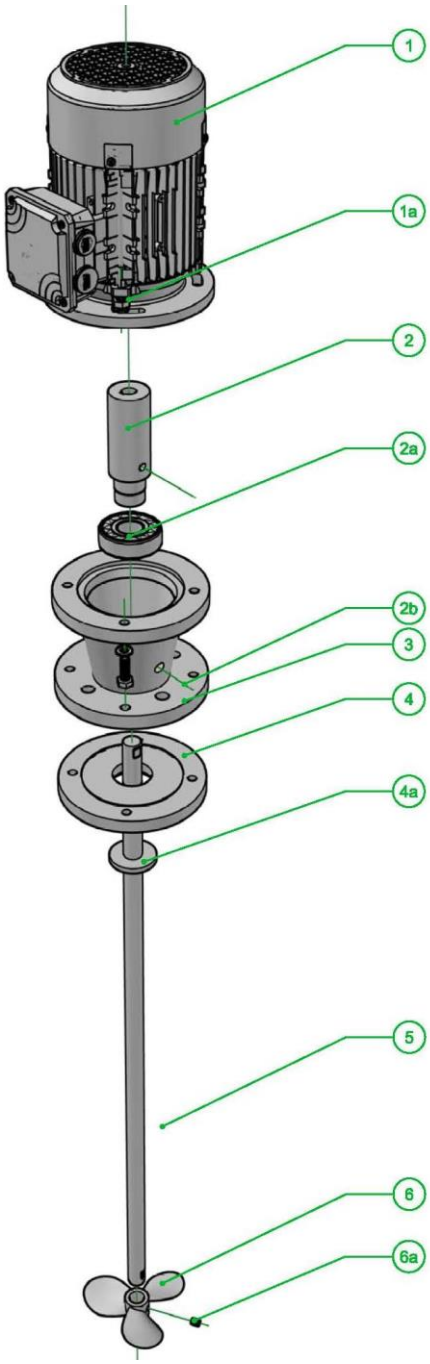
Optional extras:

- AISI 316 or PVC flange with oil seal.
- Special coatings at shaft + propeller.
- Food industry execution, polished.
- ATEX, or pneumatic motors.
- DIN or ANSI flanges.

WARNING: VHD mixers cannot run in empty tanks!

Model	Power kw	Speed rpm	A	D	L max.	Weight Kg	Vol. M3
VHD3-01 02 B 01	0,18	1000	188	100	1500	17	0,2 – 0,5
VHD3-03 03 B 02	0,37	1500	216	128	1500	17	0,5 – 1
VHD3-05 03 B 03	0,75	1500	232	140	1500	20	1 – 1,5
VHD3-06 03 B 04	1,1	1500	267	160	1500	21	1 – 2
VHD3-07 03 B 05	1,5	1500	267	200	1500	26	2 – 3

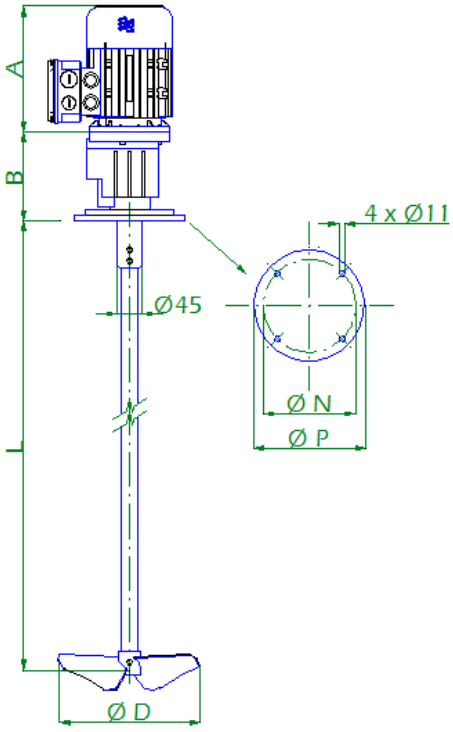
VHD3 Exploided view drawing



POS.	CANT.	DESCRIPTION	REMARKS
1	1	MOTOR	POWER (ACCORDING TO AGITATOR MODEL)
1a	4	SCREWS, WASHER AND NUTS	
2	1	BEARING SLEEVE	
2a	2	BEARING REF. 6256 2RS	
2b	1	SCREW A2 DIN916	
3	1	PALIER	ALUMMINIUM
4		OPTIONAL FLANGE	PVC O AISI 316
4a	1	RETAINER	NBR OR VITON
5	1	SHAFF	AISI 316 (OPTIONAL AISI 316+PE)
6	1	MARINE PROPELLER	AISI 316 (OPTIONAL AISI 316+PE)
6a	1	SCREW A2 DIN916	

VPP3 SERIES

VPP series are low running mixers specially designed for the mixing of quite viscous fluids. They are suitable for medium volume tanks up to 4 - 5 m3. Thanks to their life greased reducer gear it is a friendly maintenance machine just to connect and run. The S type axial profile propeller is designed to reach a balanced pumping flow/power absorption ratio. The propeller can be easily adjusted along the shaft if necessary, or it can be equipped with two or more propellers.



Main features:

- For tanks 0,5 – 5 m3.
- Motor power: 0,18 kW to 2,2 kW.
- Running speed 300 rpm (other speeds available).
- 3 blades type S axial profile propeller, diameter 200–400 mm.
- Shaft length up to 1500 mm.
- Shaft and propeller AISI 316, or polyethylene coated.

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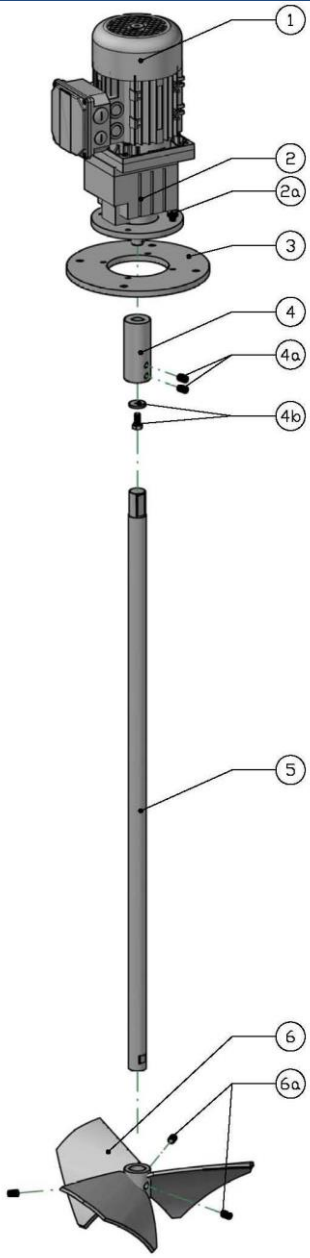
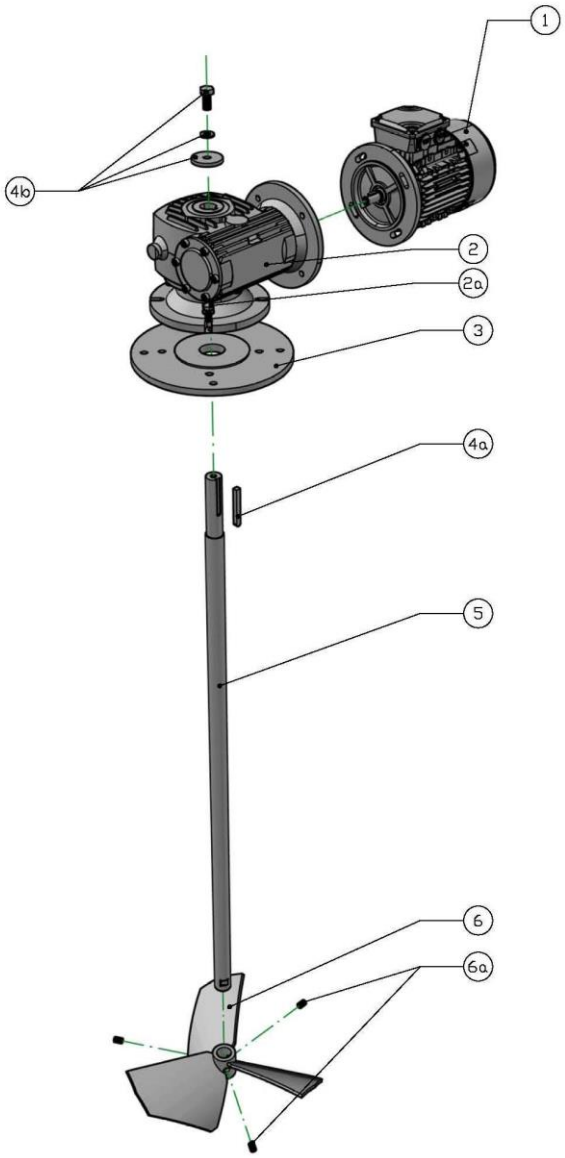
Optional extras:

- PVC or AISI 316 flange with oil seal.
- Rubber coated shaft + propeller.
- Food industry execution, polished.
- ATEX motors.
- DIN or ANSI flanges.
- Special executions.

Model	Power kw	Speed rpm	A	B	D	L max.	N	P	Weight Kg	Vol. m3
VPP3-01 03 B 01	0,18	310	188	111	200	1000	165	200	18	0,5
VPP3-02 03 B 01	0,25	300	207	144	200	1500	165	200	22	0,5
VPP3-03 03 B 25	0,37	309	207	144	250	1500	165	200	24	0,5 – 1
VPP3-05 03 B 02	0,75	309	225	148	300	1500	210	250	30	1 – 2
VPP3-06 03 B 03	1,1	313	275	179	350	1500	210	250	42	2 – 3
VPP3-07 03 B 03	1,5	316	275	179	350	1500	210	250	43	3 – 4
VPP3-08 03 B 04	2,2	316	275	179	400	1500	210	250	44	4 – 5

VPP3-VPH3 Exploded view drawing





POS.	CANT.	DESCRIPTION	REMARKS
1	1	MOTOR	POWER (ACCORDING TO AGITATOR MODEL)
2	1	REDUCER	NORMALY 315rpm
2a	4	SCREWS AND WASHERS	
3	1	FLANGE	CARBON STEEL (OPTIONAL AISI 316)
4	1	SLEEVE	
4a	2	SCREWS A2 (CHAVETA EN VPH3)	
4b	1	SCREW, WASHER DIN125	
4c			
5	1	SHAFT	AISI 316 (OPCIONAL AISI 316+PE)
6	1	TYPE "S" PROPELLER	AISI 316 (OPCIONAL AISI 316+PE)
6a	3	SCREW A2 DIN916	

VTS4-VTH4 SERIES

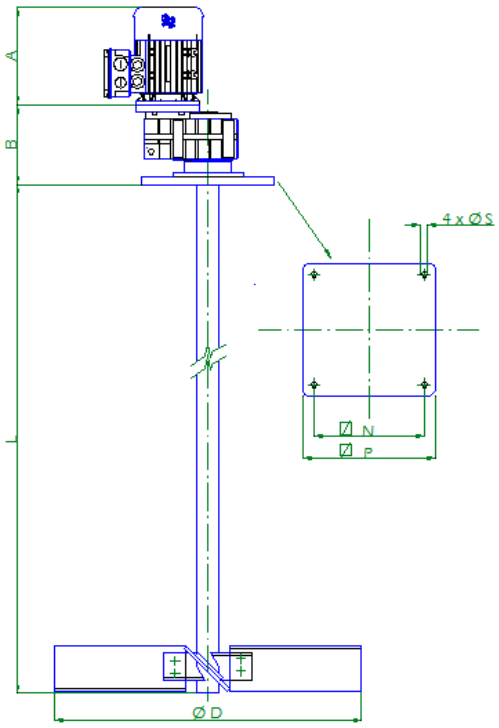
The main characteristic of VTS4 mixers is their four blades axial turbine. Axial turbine has a high power input ratio, and achieves a strong mixing effect in tanks from 4 to 15 m3 volume. Standard running speeds are 75 to 150 rpm. The rotation sense of the turbine can be easily changed just changing motor power feed wires. Thanks to their life greased reducer gear it is a friendly maintenance machine just to connect and run. VTS4 mixers can be equipped with more than one single turbine.

Main features:

- For tanks 4 – 15 m3.
- Motor power: 0,37 kW to 2,2 kW.
- Running speed 75 to 150 rpm.
- 4 blades pitched axial turbine, diameters 400 to 800 mm.
- Shaft length up to 2500 mm.
- Shaft and propeller AISI 316, AISI 304, carbon steel, rubber coated.

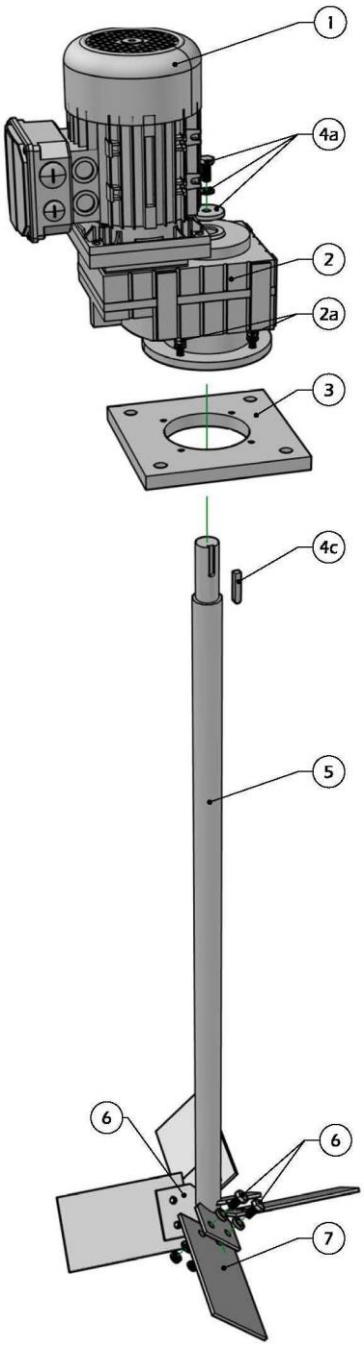
Optional extras:

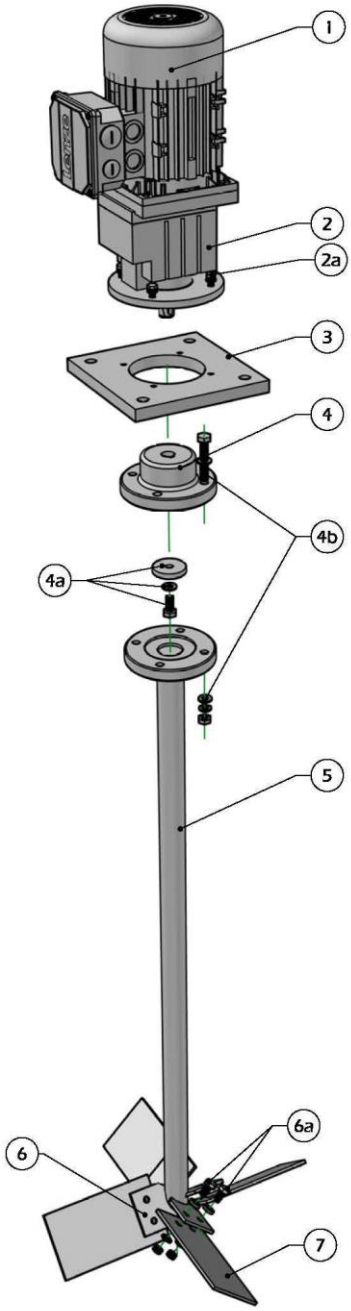
- AISI 316 or PVC plate with oil seal.
- Food industry execution, polished.
- ATEX motors.
- DIN or ANSI flanges.



Model	Power kW	Speed Rpm	A	B	D	L max.	N	P	S	Weight Kg	Vol. * m3
VTS4-02 02 C 00	0,25	96	207	184	400	2000	230	280	16	50	2
VTS4-03 02 C 01	0,37	96	207	184	500	2500	230	280	16	65	2 – 4
VTS4-05 02 C 02	0,75	96	225	190	600	2500	250	300	16	80	4 – 8
VTS4-07 02 C 03	1,5	99	275	212	700	2500	250	300	16	115	8 – 12
VTS4-08 02 C 04	2,2	99	309	212	800	2500	250	300	16	120	12 – 15

VTS4 Exploded view drawing





POS.	CANT.	DESCRIPTION	REMARKS
1	1	MOTOR	POWER (ACCORDING TO AGITATOR MODEL)
2	1	REDUCER	NORMALLY 100rpm
2a	4	SCREWS AND WASHERS	
3	1	FLANGE	CARBON STEEL (OPCIONAL AISI 316)
4	1	SLEEVE	DIN916
4a	2	SCREWS A2 (CHAVETA EN VPH3)	
4b	1	SCREW, WASHER DIN125 Y ARANDELA INOX.	
4c	1	KEY	
5	1	SHAFT	ACCORDING TO NEED
6	4	LUGS	ACCORDING TO NEED
6a	8	SCREWS, WASHERS AND NUTS	ACCORDING TO NEED
7	4	BLADES AXIAL TURBINE	ACCORDING TO NEED

VPT3 SERIES

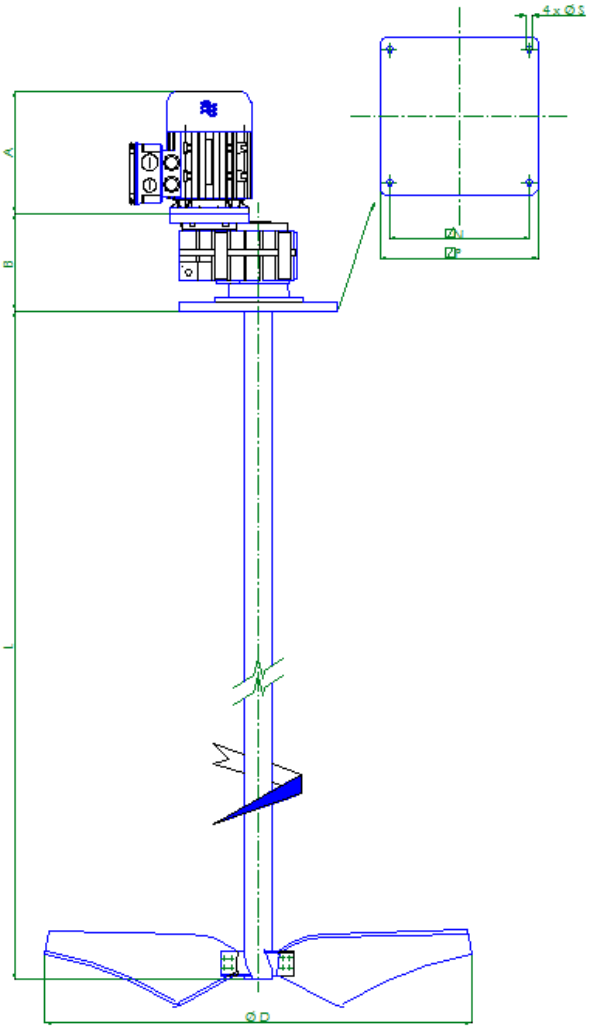
VPT3 mixers have three blades axial profile T type. They are suitable for big tanks, and can be optionally equipped with a lantern and any type of sealing, like stuffing box, dry or refrigerated mechanical seals, hydraulic labyrinth, etc. The VPT are custom made mixers, and each of them is studied and designed for their specific application. Reducer gears may be helical gears type, or parallel shaft. Shafts longer than 6 meter may be executed in two or more pieces. VPT mixers can have two or more propellers on the shaft. Flow direction and turning sense can be chosen.

Main features:

- For big tanks.
- Motor power: 0,55 kW to 45 kW.
- Running speed 30 to 150 rpm.
- 3 blades axial profile T type, diameters 800 to 4000 mm.
- Shaft length up to 12000 mm.
- Shaft and propeller AISI 316, AISI 304, carbon steel, rubber coated, special alloys.

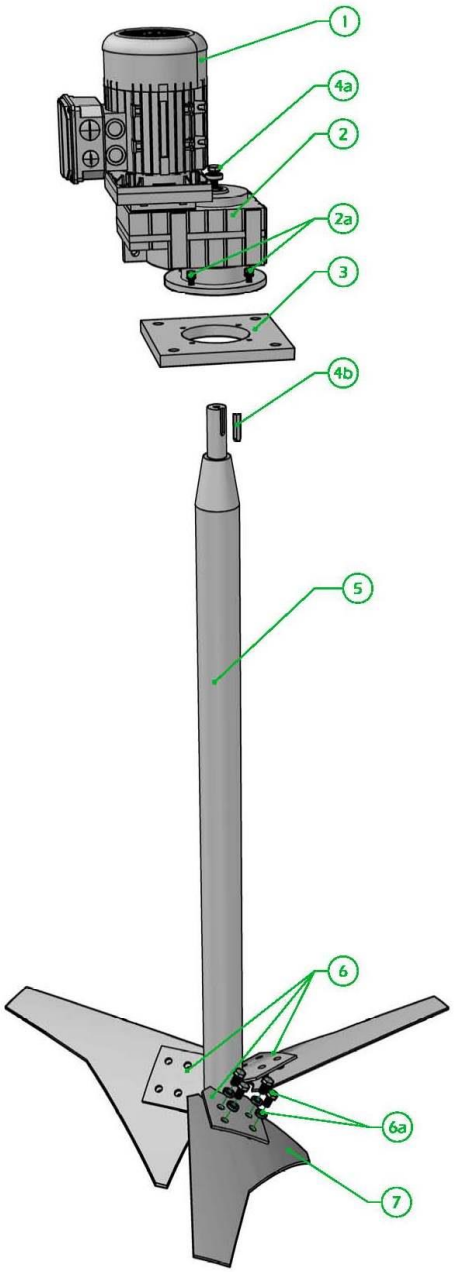
Optional extras:

- AISI 316 or coated plate with oil seal.
- Food industry execution, polished.
- ATEX motors.
- DIN or ANSI flanges.
- Lantern with sealing: stuffing box, mechanical seal, Hydraulic labyrinth.
- Cooled fixation plate.



Model	Power kw	Speed rpm	A	B	C	D	L	N	P	S	Weight Kg
VPT3-											
VPT3-											

Data according to specific needs of each application .



POS.	CANT.	DESCRIPTION	REMARKS
1	1	MOTOR	POWER (ACCORDING TO AGITATOR MODEL)
2	1	REDUCER	
2a	4	SCREWS AND WASHERS	
3	1	SQUARE PLATE	CARBON STEEL (OPTIONAL AISI 316)
4a	2	SCREWS AND WASHERS	
4b	1	KEY	
5	1	SHAFT	ACCORDING TO NEED
6	3	LUGS	ACCORDING TO NEED
6a	12	SCREWS, WASHERS AND NUTS	ACCORDING TO NEED
7	3	TYPE "T" PROPELLER	ACCORDING TO NEED

VPT3 Exploded view drawing

VPS3 SERIES

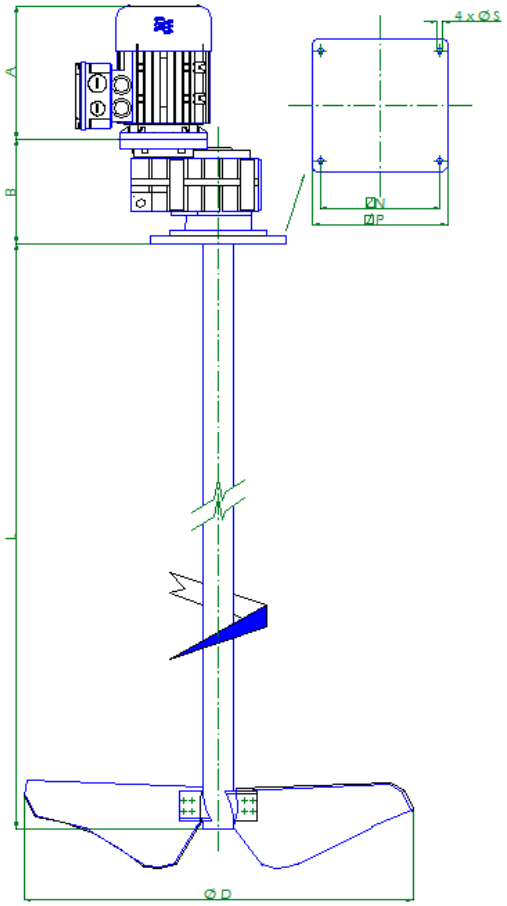
VPS3 mixers have three blades axial profile S type. That profile performances a great pumping volume with a quite low absorbed power. They are suitable for big tanks, and can be optionally equipped with a lantern and any type of sealing, like stuffing box, dry or refrigerated mechanical seals, hydraulic labyrinth, etc. The VPS are custom made mixers, and each of them is studied and designed for their specific application. Reducer gears may be helical gears type, or parallel shaft. Shafts longer than 6 meter may be executed in two or more pieces. VPS mixers can have two or more propellers on the shaft. Flow direction and turning sense can be chosen.

Main features:

- For big tanks.
- Motor power: 0,55 kW to 45 kW.
- Running speed 30 to 150 rpm.
- 3 blades axial profile T type, diameters 800 to 4000 mm.
- Shaft length up to 12000 mm.
- Shaft and propeller AISI 316, AISI 304, carbon steel, rubber coated, special alloys.

Optional extras:

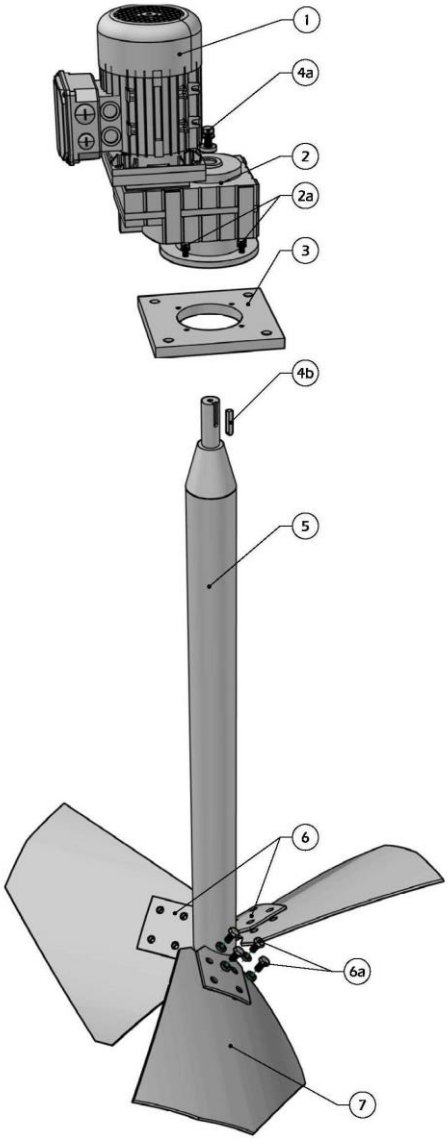
- AISI 316 or coated plate with oil seal.
- Food industry execution, polished.
- ATEX motors.
- DIN or ANSI flanges.
- Lantern with sealing: stuffing box, mechanical seal, hydraulic labyrinth.
- Cooled fixation plate.



Model	Power kw	Speed rpm	A	B	C	D	L	N	P	S	Weight Kg
VPS3-											
VPS3-											

Data according to specific needs of each application .

VPS3 Exploded view drawing



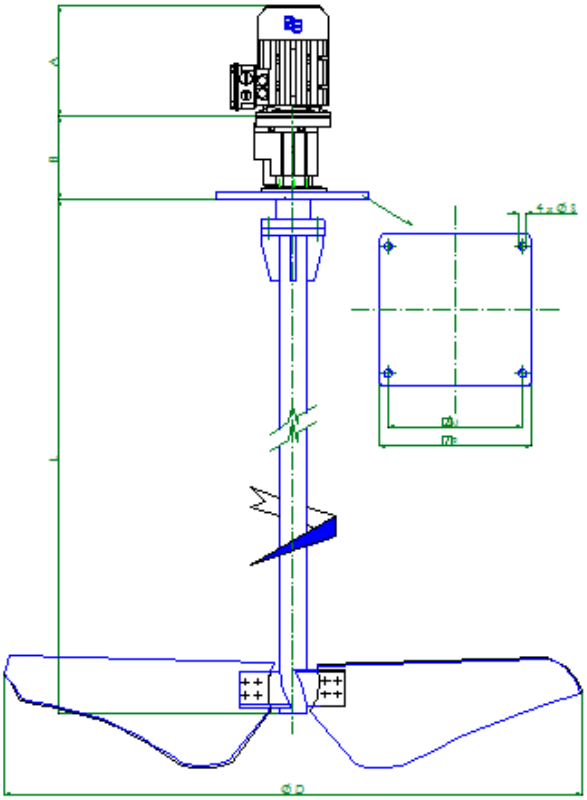
POS.	CANT.	DESCRIPTION	REMARKS
1	1	MOTOR	POWER (ACCORDING TO AGITATOR MODEL)
2	1	REDUCER	
2a	4	SCREWS AND WASHERS	
3	1	SQUARE PLATE	CARBON STEEL (OPTIONAL AISI 316)
4a	2	SCREWS AND WASHERS	
4b	1	KEY	
5	1	SHAFTS	ACCORDING TO NEED
6	3	LUGS	ACCORDING TO NEED
6a	3	SCREWS, WASHERS AND NUTS (SET)	ACCORDING TO NEED
7	1	TYPE "S" PROPELLER	ACCORDING TO NEED

SERIE VFR3

VFR3 flocculators have three blades axial profile S type. That profile performances a great pumping volume at low speed with a quite low absorbed power. They are suitable for big tanks, and can be optionally equipped with a lantern and any type of sealing, like stuffing box, dry or refrigerated mechanical seals, hydraulic labyrinth, etc. The VFR3 are custom made mixers, and each of them is studied and designed for their specific application. Reducer gears may be helical gears type, or parallel shaft. Longer than 6 meter shafts may be executed in two or more pieces. VFR3 mixers can have two or more propellers on the shaft. Flow direction and turning sense can be chosen. .

Main features:

- Flocculation.
- Motor power: 0,18 kW to 15 kW.
- Running speed 5 to 50 rpm.
- 3 blades axial profile S type, diameters 400 to 4000 mm.
- Shaft length up to 12000 mm.
- Shaft and propeller AISI 316, AISI 304, carbon steel, rubber coated, special alloys.

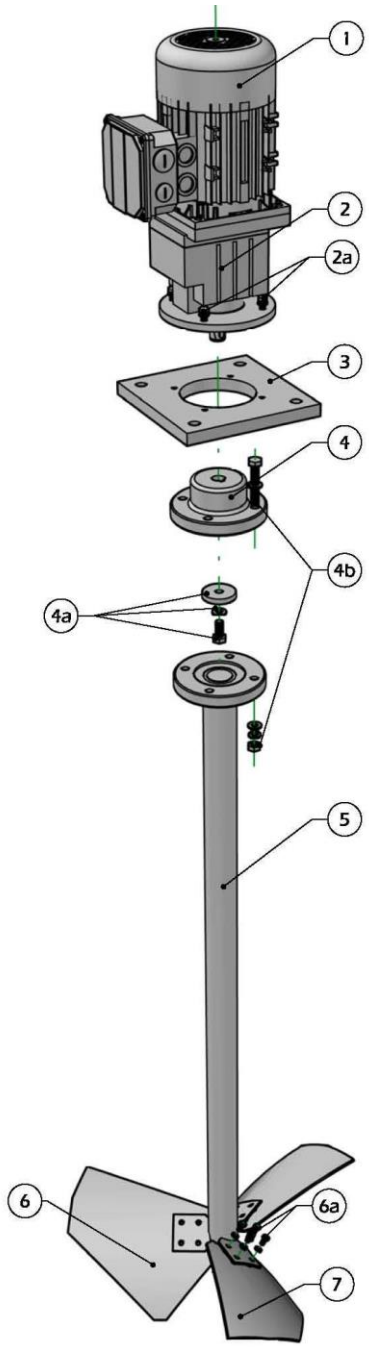


Optional extras:

- AISI 316 or coated plate with oil seal.
- Food industry execution, polished.
- ATEX motors.
- DIN or ANSI flanges.
- Lantern with sealing: stuffing box, mechanical seal, hydraulic labyrinth.

Model	Motor kw	rpm	A	B	C	D	L	N	P	S	Weight Kg
VFR3-		Data according to specific needs of each application .									
VFR3-											

VFR3 Exploided View Drawing



POS.	CANT.	DESCRIPCION	OBSERVACIONES
1	1	MOTOR	POWER (ACCORDING TO AGITATOR MODEL)
2	1	REDUCER	
2a	4	SCREWS AND WASHERS	
3	1	SQUARE PLATE	CARBON STEEL (OPTIONAL AISI 316)
4	1	COUPLING	CARBON STEEL (OPTIONAL IN OTHER MATERIALS))
4a	1	SCREW AND WASHERS	
4b	4	SCREWS, WASHERS DIN125, GROWER WASHERS DIN127	
5	1	SHAFT	ACCORDING TO NEED
6	3	LUGS	ACCORDING TO NEED
6a	3	SCREWS, WASHERS AND NUTS SET	ACCORDING TO NEED
7	1	TYPE "S" PROPELLER	

SERIE VFT2

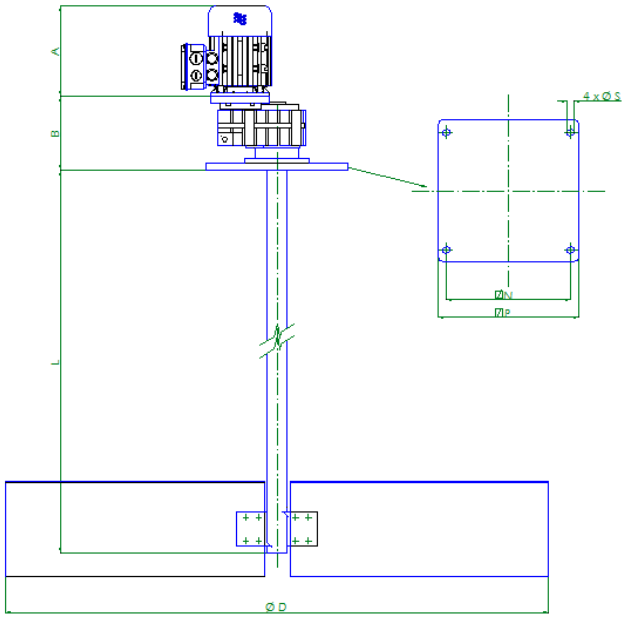
VFT mixers are specific for flocculation process. They are equipped with two or three blades axial turbine blades with great blade surface, to develop a great flow rate at slow speed. Each VFT mixer is specially designed for an optimum adapting to the tank geometry. Longer than 6 meter shafts may be executed in two or more pieces. VFT mixers can have two or more propellers on the shaft. Flow direction and turning sense can be chosen.

Main features:

- For big tanks.
- Motor power: 0,25 kW to 3 kW.
- Running speed 5 to 40 rpm.
- 2/3 blades axial profile F type, diameters 400 to 40C
- Shaft length up to 12000 mm.
- Shaft and propeller AISI 316, AISI 304, carbon steel, ı

Optional extras:

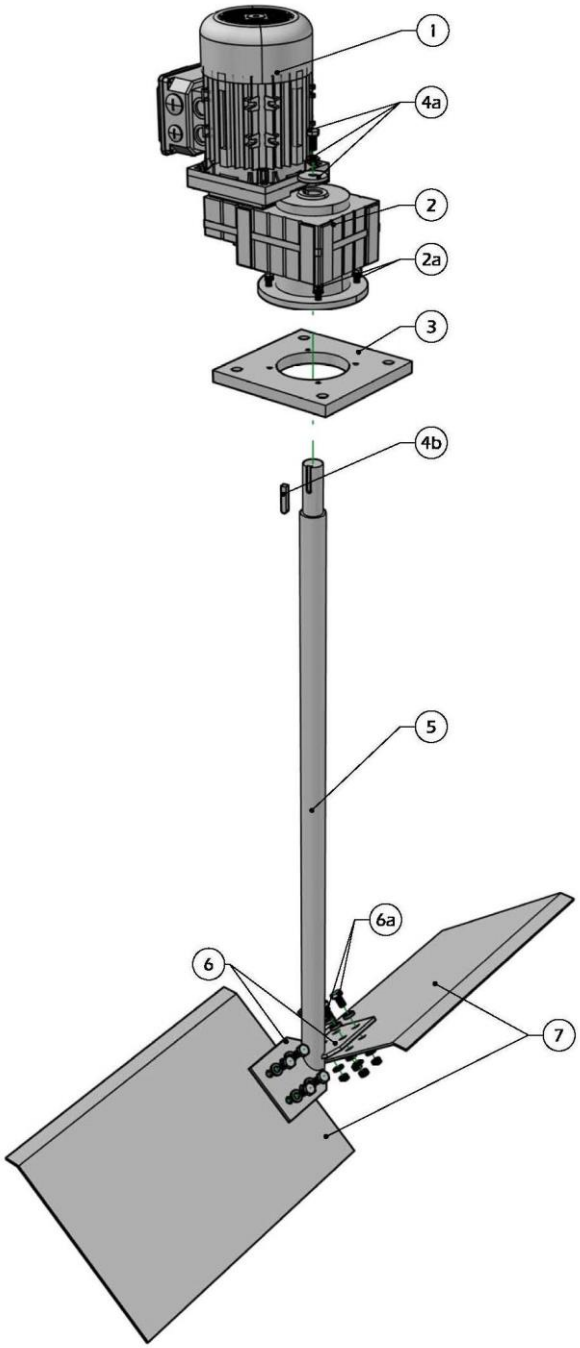
- AISI 316 or coated plate with oil seal.
- Food industry execution, polished.
- ATEX motors.
- DIN or ANSI flanges.



Model	Motor kw	rpm	A	B	C	D	L	N	P	S	Kg
VFT2-											
VFT2-											

Data according to specific needs of each application .

VFT2 Exploided view drawing



POS.	CANT.	DESCRIPTION	REMARNS
1	1	MOTOR	POWER (ACCORDING TO MODEL MIXER)
2	1	REDUCER	
2a	4	SCREWS AND WASHERS	QUALITY 8.8
3	1	SQUARE PLATE	A.CARBONO (OPCIONAL AISI 316)
4a	1	SCREW AND WASHERS	QUALITY 8.8
4b	1	KEY	
5	1	SHAFTS	ACCORDING TO NEED
6	2	LUGS	ACCORDING TO NEED
6a	3	SCREWS, WASHERS AND NUTS SET	ACCORDING TO NEED
7	2	VFT BLADES	ACCORDING TO NEED

HPS3 SERIES

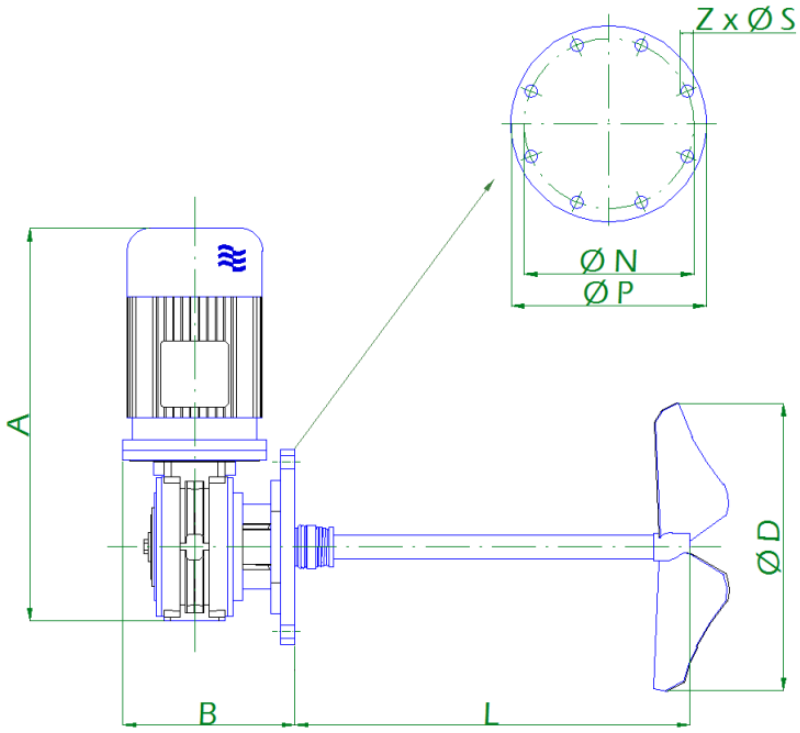
The HPS3 series are side entry mixers. They are very appreciate in wine industry, breweries, dairies, and mainly in big volume storage tanks from 10 to 100 m3, or even more, to keep non viscous liquids homogenously. A mechanical seal, normally silicon carbide/viton, ensures a leakage free work. The propeller is a 3 blades axial profile type S. Standard execution has a stainless steel DIN fixation flange. As option the mixer can be performed with an additional emergency sealing flange to avoid liquid leakages in case of any damage in the mechanical seal, until the seal can be repaired. A more sophisticated system, allows to do maintenance works (sealing change) without the need of emptying the tank.

Main features:

- For tanks 10 – 100 m3.
- Motor power: 0,75 kW to 3kW.
- Running speed 290 rpm.
- 2 blades axial profile diameters 250 to 450 mm.
- Silicon carbide mechanical seal.
- Shaft and propeller AISI 316, AISI 304.

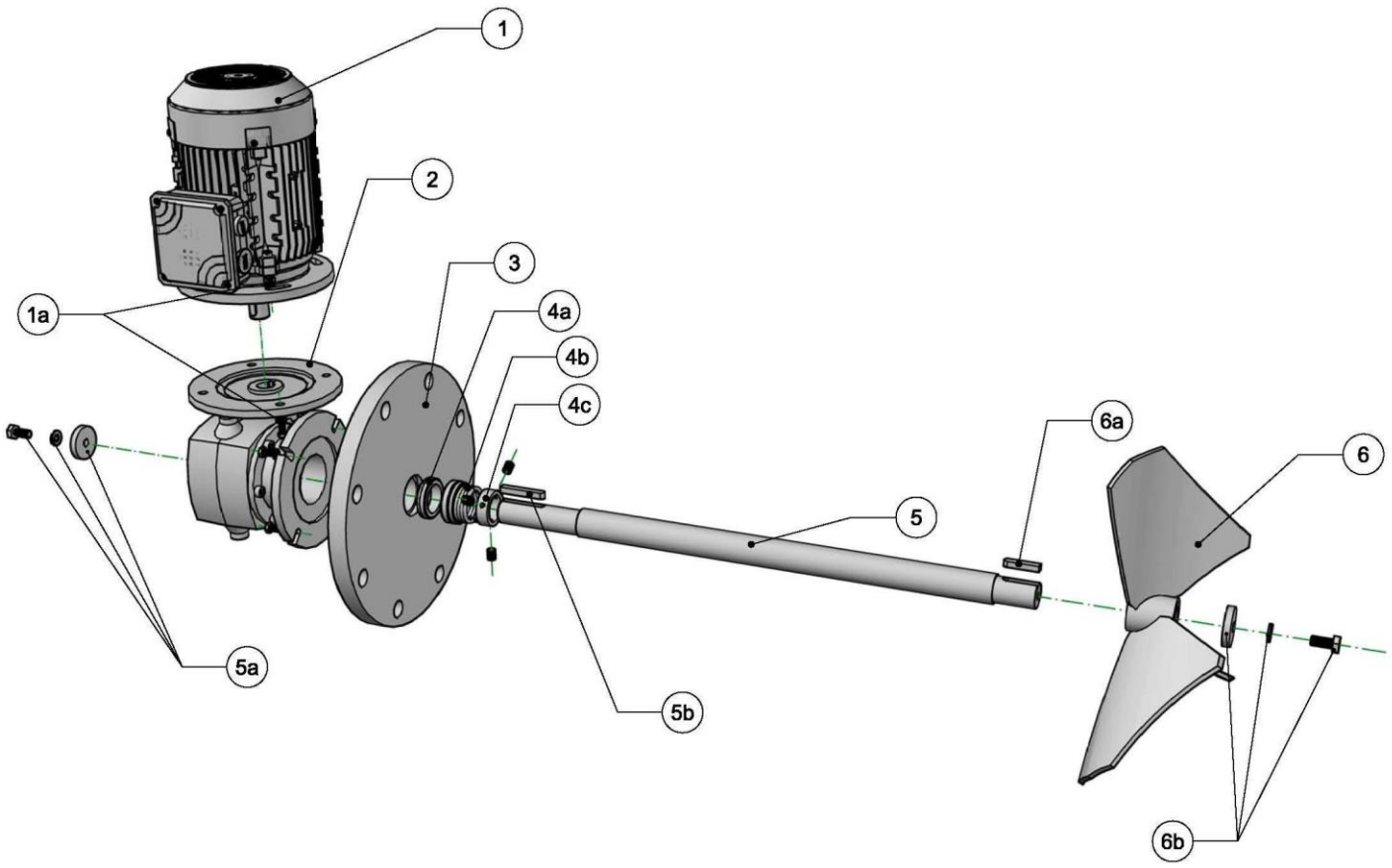
Optional extras:

- Emergency sealing flange.
- Full tank maintenance device.
- Food industry execution, polished.
- ATEX motors.
- ANSI flanges.



Model	Power kW	Speed rpm	A	B	D	L	N	P	ZxS	Weight Kg	Vol. M3
HPS3-03 17 B 01	0,37	290	336	162	250	450	295	340	8x23	32	10
HPS3-05 17 B 02	0,75	290	380	192	300	450	295	340	8x23	40	20
HPS3-06 17 B 03	1,1	290	471	211	350	500	295	340	8x23	50	30
HPS3-08 17 B 04	2,2	290	510	261	400	550	295	340	8x23	60	50
HPS3-09 17 B 05	3	290	546	360	450	600	295	340	8x23	75	100

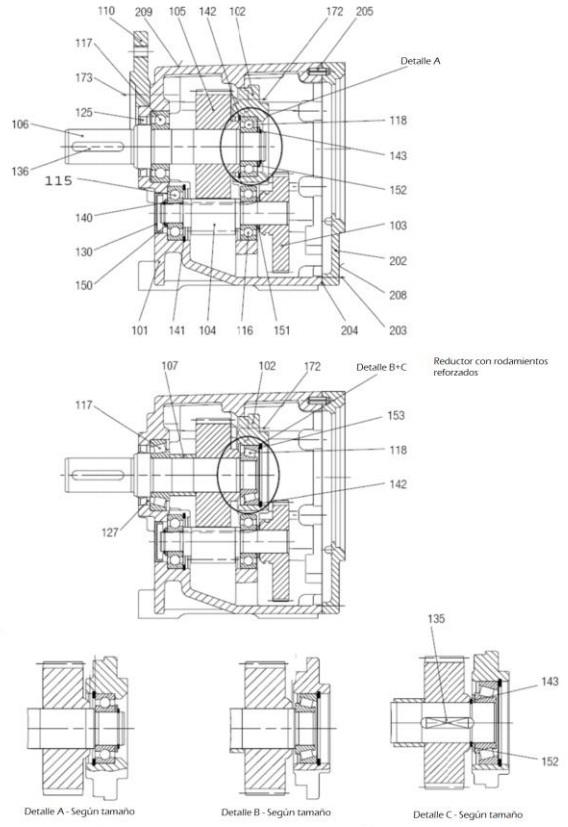
HPS3 Exploided view drawing



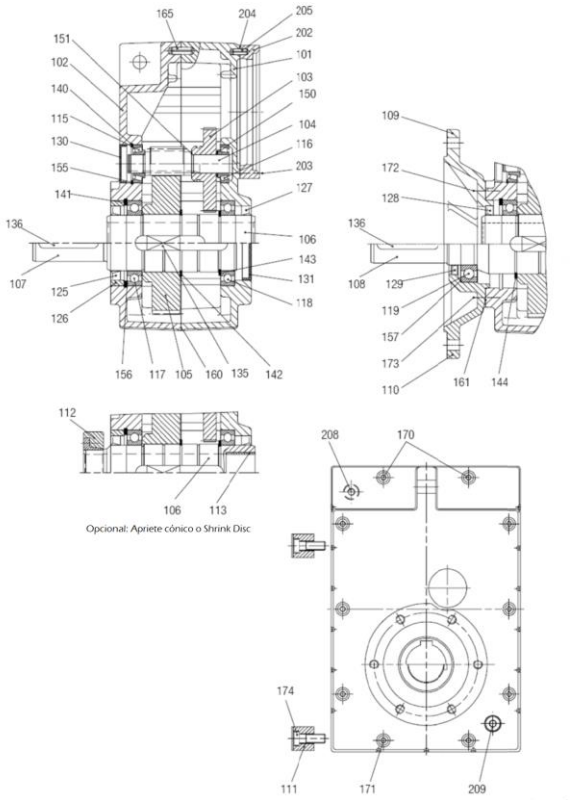
POS.	CANT.	DESCRIPTION	REMARKS
1	1	MOTOR	POWER (ACCORDING TO AGITATOR MODEL)
1a	4	SCREWS, WASHERS AND NUTS	
2	1	REDUCER	NORMALLY 315rpm
2a	4	SCREWS AND WASHERS	
3	1	FLANGE	CARBON STEEL+ AISI 316
4a	1	STATIC PART (MECHANICAL SEAL)	
4b	1	ROTATING PART (MECHANICAL SEAL)	
5	1	SHAFT	AISI 304 OR AISI 316
5a		SCREW AND WASHERS	
5b		KEY	
6	1	TYPE "S" PROPELLER	AISI 304 OR AISI 316
6a	1	KEY	DIN916
6b	1	SCREW AND WASHERS	

Reducer section

Coaxial with helicoidal gears

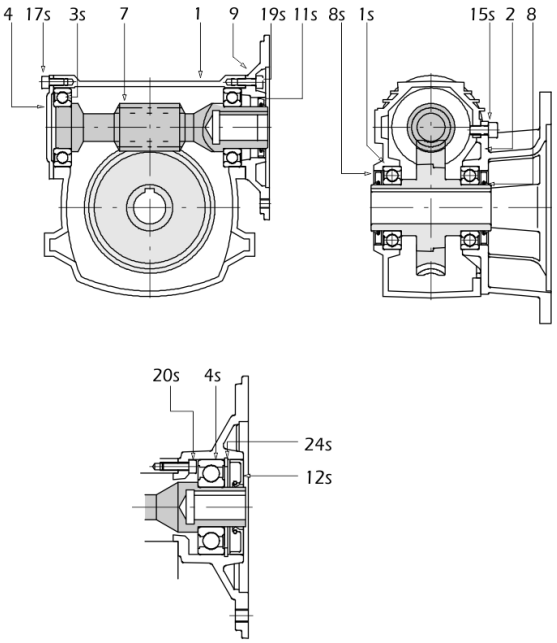


Hollow shaft with helicoidal gears



POS.	DESCRIPCIÓN	POS.	DESCRIPCIÓN	POS.	DESCRIPCIÓN
101	HOUSING	125	SHAFT SEAL	154	SHIM
102	COVER / HOUSING	126	RING	155	SHIM
103	GEAR	127	SHAFT SEAL	156	SHIM
104	PINION SHAFT / WORM SHAFT	128	SHAFT SEAL	157	SHIM
105	GEAR / WORM GEAR	129	SHAFT SEAL	158	BUSHING
106	HOLLOW SHAFT / SHAFT	130	COVER	159	SHIM
107	SHAFT / BUSHING	131	COVER	160	JOINT
108	SHAFT	132	COVER	161	JOINT
109	FLANGE	135	KEY	170	ALLEN SCREW
110	FLANGE	136	KEY	171	ALLEN SCREW
111	FOOT (ONLY GFL)	139	CIRCLIP	172	ALLEN SCREW
111	BEVEL GEAR SET (ONLY GKS)	140	CIRCLIP	173	ALLEN SCREW
112	SHRINK DISK	141	CIRCLIP	174	ALLEN SCREW
113	BUSHING	142	CIRCLIP	201	PUSH-IN PINION
115	TAPERED ROLLER BEARING	143	CIRCLIP	202	COVER
116	TAPERED ROLLER BEARING	144	CIRCLIP	203	ALLEN SCREW
117	DEEP GROOVE BALL BEARING / TAPERED ROLLER BEARING	145	CIRCLIP	204	JOINT
118	DEEP GROOVE BALL BEARING / TAPERED ROLLER BEARING	146	CIRCLIP	205	PIN
119	DEEP GROOVE BALL BEARING	150	SHIM	208	FILLER PLUG
120	TAPERED ROLLER BEARING	151	SHIM	209	FILLER PLUG
121	TAPERED ROLLER BEARING	152	SHIM		
124	RING	153	SHIM		

Worm gear



POS.	DESCRIPCIÓN	POS.	DESCRIPCIÓN
1	FLANGE BOX	12S	OIL SEAL
2	OUTPUT FLANGE	15S	CYLINDER SCREW
4	BLIND COVER	16S	CYLINDER SCREW
7	ENDLESS SCREW	17S	CYLINDER SCREW
8	CROW-OUTPUT SHAFT UNIT		
9	MOTOR FLANGE	18S	CYLINDER SCREW
10		19S	CYLINDER SCREW
1S	BEARING	20S	CYLINDER SCREW
3S	BEARING	24S	ELASTIC RIG
4S	BEARING		
5S	BEARING		
7S	BEARING		
8S	OIL SEAL		
11S	OIL SEAL		

Apendix

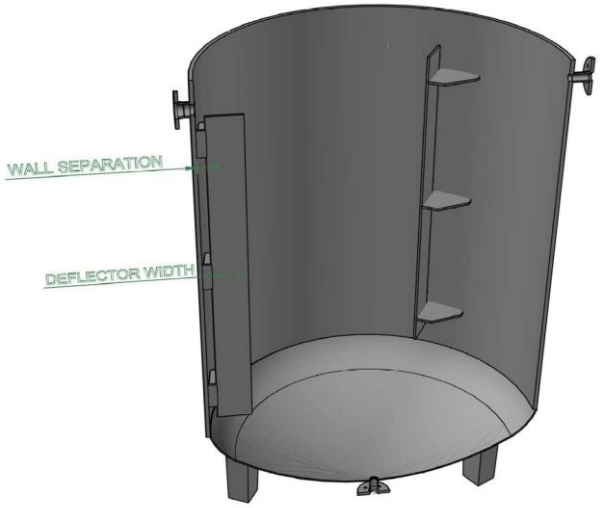
Tightening torque for screws

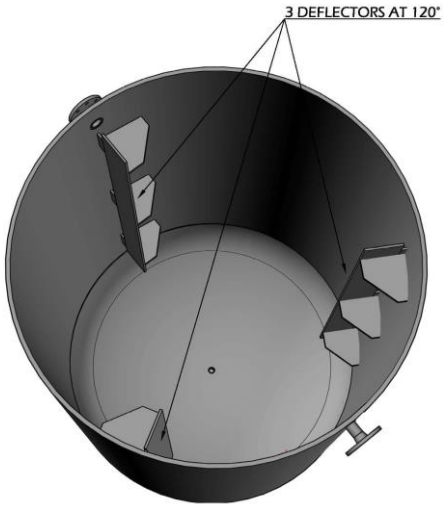
- ✓ It is the torque necessary to tighten one screw and it is defined by the screw material, its diameter and used quality.
- ✓ The tightening torque for the screws delivered by FluidMix are:

Carbon Steel screws		S.Steel screws	
Screw diameter mm	Tightening torque Nm	Screw diameter mm	Tightening torque Nm
1.6	0.12	1.6	0.45
2	0.25	2	0.55
2.5	0.53	2.5	0.80
3	0.91	3	1.85
4	2.09	4	4.1
5	4.14	5	8.0
6	7.1	6	13.9
8	17.4	8	33.9
10	34	10	69
12	59	12	117
14	95	14	188
16	148	16	291
18	205	18	411
20	291	20	586
22	400	22	
24	500	24	
27	741	27	
30	1005	30	
33	1366	33	

Deflectors

- ✓ In case of centred placing of vertical agitators in cylindrical tanks it is recommended to place three deflectors at 120º with a height equivalent to the 75% of the hoop height and the rest of dimensions according to the enclosed table. In case of tanks with dish bottom the deflector must go, at most, till the tangent line.





Tank diameter	Deflector width	Wall separation
500	40	5
600	50	10
800	60	10
1000	80	10
1200	100	20
1600	120	20
2000	150	30
2500	160	30
3000	180	30
3500	190	35
4000	200	40
4500	250	50
5000	300	60
6000	350	70
8000	400	80
10000	500	100
12000	600	120

Declaration of conformity

Declaración CE de acuerdo con la Directiva 2006/42/CE
Declaration of conformity 2006/42/EC
Konformitätesrklärung 2006/42/EG

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Declaramos bajo nuestra exclusiva responsabilidad que las siguientes cuasi máquinas:

Declare under our sole responsibility that the following partly completed machinery:

Erklärt eigenverantwortlich, daβ die Produkte:

Electroagitadores mecánicos Mechanical Electroagitators *Mechanische Elektrorührwerke*	VHS3, VHD3,VPP3, VPH3, VTS4, VTG, VTR, HPS3, VPT, VPS, VFR, VFV, VFT

Están conformes con la **Directiva 2006/42/CE** *aunque se prohíbe la puesta en servicio antes de que la máquina a la que será incorporada no haya sido declarada conforme a las disposiciones de la Directiva.*

Are in compliance with **2006/42/EC Machines Directive** *though the starting is prohibited before the machine to which it will be incorporated is in agreement with the Directive dispositions.*

Auf die sich diese Erklärung bezieht, den folgenden und/oder anderen Normativen Dokumenten entsprechen wie definiert in **Maschinenrichtlinie 2006/42 EG,** *obwohl die Inbetriebnahme des Geräts verboten ist bis die Maschiene wo es angebant wird gemäsig zugelassen ist.*

Ángel Ruiz
Production Manager
FluidMix, S.L.
Madrid, 11.05.2012

ISO 9000

CERTIFICADO

OCA Instituto de Certificación, S.L.U.

Certifica que el Sistema de Gestión de la Calidad de la organización

FLUIDMIX, S.L.

C/ Tineo, 17- bajo 28031 MADRID

aplicable a:

DISEÑO, FABRICACIÓN, COMERCIALIZACIÓN, ASISTENCIA TÉCNICA DE EQUIPOS DE AGITACIÓN Y SISTEMAS DE DOSIFICACIÓN

conforme con la norma:

UNE-EN ISO 9001:2008

Certificado nº 5200/12/0873

Fecha certificado inicial: 16 de agosto de 2012
Fecha de emisión: 16 de agosto de 2012
Fecha de caducidad: 16 de agosto de 2015

El Consejero Delegado

Josep Fajula Chopo

CERTIFICADORA ACREDITADA POR ENAC

ENAC CERTIFICACIÓN Nº 8/C-SC055

Este certificado no tiene validez sin su contrato.
Cualquier aclaración adicional relativa tanto al alcance de este certificado como a la aplicabilidad de los requisitos de la norma se puede obtener consultando a la organización.

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